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ABSTRACT

The papers in this volume outline a vision for teacher education based on the concept of contextual teaching, defined as teaching that enables learning in a variety of in- and out-of-school contexts to solve simulated or real-world problems. They are based on the realization that the construction of knowledge is situated within, and greatly influenced by, physical, social, cultural, and subject matter context. Paper titles and authors are as follows: "Contextual Teaching and Learning: An Overview of the Project" (Susan Jones Sears, Susan B. Hersh); "Introduction to the Commissioned Papers" (Kenneth R. Howey); "The Role of Context in Teacher Learning and Teacher Education" (Hilda Borko, Ralph T. Putnam); "Problem-Based Learning: Learning and Teaching in the Context of Problems" (Jean W. Pierce, Beau Fly Jones); "Community Service Learning: Collaborating with the Community as a Context for Authentic Learning" (Rahima C. Wade); "Preparing Preservice Teacher Education Students to Use Work-based Strategies to Improve Instruction" (Richard L. Lynch, Dorothy Harnish); "Culturally Relevant Pedagogy in Contextual Teaching and Learning" (Lauren Jones Young); "The Role of Self-Regulated Learning in Contextual Teaching: Principles and Practices for Teacher Preparation" (Scott G. Paris, Peter Winograd); "Authentic Assessment of Teaching in Context" (Linda Darling-Hammond, Jon Snyder); and "Afterword" (Kenneth R. Howey). An annotated bibliography contains 40 references. (SK)

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Contextual Teaching and Learning:

Preparing Teachers
to Enhance Student Success
in and Beyond School

nation Series No. 376

The Ohio State
University
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Foreword

The Educational Resources Information Center Clearinghouse on Adult, Career, and Vocational Education (ERIC/ACVE) is 1 of 16 clearinghouses in a national information system that is funded by the Office of Educational Research and Improvement (OERI), U.S. Department of Education. This paper was developed to fulfill one of the functions of the clearinghouse—interpreting the literature in the ERIC database. This paper should be of interest to teacher educators and prospective teachers.

The papers in this volume originated from Preparing Teachers to Use Contextual Teaching and Learning Strategies to Enhance Student Success in and beyond School, a project sponsored by the Office of Vocational and Adult Education and the National School-to-Work Office, U.S. Department of Education. The project was conducted by the Ohio State University College of Education in partnership with Bowling Green State University, under the direction of the Project Core Team: Kenneth R. Howey, Susan Sears, Robert Berns, Johanna DeStefano, and Sandra Pritz. The papers are being published by ERIC/ACVE in cooperation with the ERIC Clearinghouse on Teaching and Teacher Education.

ERIC/ACVE would like to thank the authors of the commissioned papers in this volume:

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Contextual Teaching and Learning: An Overview of the Project

Susan Jones Sears and Susan B. Hersh
The Ohio State University

In 1983, the National Commission on Excellence in Education delivered a stinging report about the status of education in the United States. The report, *A Nation at Risk*, suggested that we were losing ground in ensuring both quality and equity in our schools. To turn the tide, it was suggested that higher standards be implemented at every level and that all high school students, regardless of background or vocational prospects, engage in a series of rigorous courses previously reserved only for the college bound.

Many other reports and studies before and since have documented the declining academic performance of American students. Several of these studies also identify the lack of rigorous academic standards as a key determinant of the students' declining performance. Schools without standards provide no specific expectations for student learning or achievement and, often, the result is low achievement. Evidence exists to suggest that when students are expected to learn clearly articulated academic content in an environment conducive to learning, they will make far greater progress than students in a learning environment without standards. (See Rosenshine and Stevens 1986 for a review of the studies.)

The connection between student performance and standards has led to reform efforts specifically designed to set high standards and to develop new ways to measure student performance. Rigorous academic standards, a key element of both the Goals 2000 and school-to-work initiatives, are expected to provide students, parents, community leaders, and employers with a clear understanding of what all students should know and be able to do in specific academic disciplines. Academic standards, coupled with the developing system of occupational skill standards (see National Skill Standards Board, http://www.nssb.org) that specify the skills necessary in broadly defined occupational clusters, can provide clear goals for all students regarding the knowledge and skills necessary for productive employment and further education.

The connection between vocational skills and more rigorous standards has garnered attention as evidence mounts that the skills needed for success in the work force are increasing. It has been suggested that nearly 50% of the jobs in the 21st century will require the higher-order thinking skills once taught to the very few and that only about 10% of all jobs will be routine, low-skilled work (Drucker 1994). Thus, much of the dialogue about reforming schooling during the last decade has focused on the limited preparation students receive to facilitate their transition from school to work. Many students, both those planning to attend college and those planning to enter the work force immediately after high school, see no connection between their performance in high school and later employment opportunities. Many students experience nothing to suggest that coursework and activities typically associated with high schools will affect their success in getting a job when they graduate. This disconnection between schools and the world of work and real-life problems contributes to the alienation and low motivation of many students.

The 103rd United States Congress, in an effort to encourage educational reform and facilitate students' transition from school to work, passed the School-to-Work (STW) Opportunities Act of 1994 mandating the development of a national framework for building School-to-Work Opportunities Systems in all 50 states. The national framework was expected to help each state create an STW system that is part of a comprehensive plan developed under Goals 2000 and National Skill Standards Act. The STW plan should—

- offer performance-based education and training that prepares students for first jobs in high-skill, high wage careers and increases their opportunities for further education in a 4-year institution;
- use workplaces as active learning environments in the educational process by making employers joint partners with educators in providing opportunities for all students; and
- promote the formation of local partnerships between elementary schools and secondary schools to improve the knowledge and skills of youth.

Congress cited the following factors as its rationale for action:

1. Three-fourths of high school students enter the work force without baccalaureate degrees and many do not possess the academic and entry-level occupational skills necessary to succeed in the changing workplace.
2. A substantial number of youths in the United States, especially disadvantaged students of diverse racial, ethnic, and cultural backgrounds, and students with disabilities, do not complete high school.
3. Unemployment among youths in the United States is intolerably high, and earnings of high school graduates have been falling relative to earnings of individuals with more education.
4. The nation lacks a comprehensive and coherent system to help its youth acquire the knowledge, skills, abilities, and information about and access to the labor market necessary to make an effective transition from school to career-oriented work or to further education and training.
5. Students can achieve high academic and occupational standards, and many can learn better and retain more when students learn in context, rather than in the abstract.
6. The work-based learning approach, which is modeled after the time-honored apprenticeship concept, integrates theoretical instruction with structured on-the-job training; this approach, combined with school-based learning, can be very effective in engaging student interest, enhancing skill acquisition, developing positive work attitudes, and preparing youths for high-skill, high wage careers.

The School-to-Work Opportunities Act endorses the idea that all students should have the opportunity to develop intellectually through work on practical projects in the classroom, the community, and the workplace. For example, students who acquire complex biological concepts while interning at a local hospital are more likely to see a rationale for learning what may seem like abstract and irrelevant scientific material and students who volunteer in a political campaign learn about government and civics in a way not possible by reading a text in American History. For years, vocational educators have used hands-on activities or practical applications to prepare students for auto mechanics, carpentry, cosmetology, and other trades. In fact, all students should have the opportunity to benefit from a pedagogy that applies academic concepts in learning in school and actual or simulated problems in the community and workplace.

Reflecting the belief that teachers must be encouraged to use instructional strategies that connect students to real-world learning in communities and the workplace, the Office of Vocational and Adult Education and the National School-to-Work Office disseminated a Request for Proposals (RFP) in summer 1997. The RFP acknowledged the widespread agreement that what teachers know and can do is the most important influence on what students learn and that these are greatly influenced by teacher education and conditions in schools. The RFP underscored, however, that what will shape an aligned and coordinated reform of initial teacher preparation and conditions in PreK-12 schools is the prevalent conception of teaching and learning that is held. A limited view of teaching results in limited practice; this has been a long-standing problem. A bolder vision of teaching and learning is a needed precursor to reform. Thus, the RFP called for a rich, detailed portrayal of what the best of contemporary scholarship and practice reveal as potent and ambitious forms of teaching and learning and—beyond that—how teachers can be prepared to teach in this manner.

In response to the RFP, the Ohio State University, in partnership with Bowling Green State University, has spearheaded a sustained national effort to further clarify this ambitious conception of teaching and learning—termed Contextual Teaching and Learning (CT&L)—and to identify examples of it, especially in exemplary programs of teacher preparation across the country. The Project Core Team consisting of Ken Howey, Susan Sears, Bob Berns, Johanna DeStefano, and Sandra Pritz, reviewed the literature and held intensive discussions. They then defined the term:

> Contextual teaching is teaching that enables learning in which pupils employ their academic understandings and abilities in a variety of in- and out-of-school contexts to solve simulated or real-world problems, both alone and in various dyad and group structures. Activities in which teachers use contextual teaching strategies help students make connections with their roles and responsibilities as family members, citizens, students, and workers. Learning through and in these kinds of activities is commonly characterized as problem based, self-regulated, occurring in a variety of contexts including the community and work sites, involving teams or learning groups, and responsive to a host of diverse learner needs and interests. Further, contextual

“Contextual teaching is teaching that enables learning in which pupils employ their academic understandings and abilities in a variety of in- and out-of-school contexts to solve simulated or real-world problems.”

> teaching and learning emphasizes higher-level thinking; knowledge transfer; and collection, analysis, and synthesis of information and data from multiple sources and viewpoints. CT&L includes authentic assessment that is derived from multiple sources and is ongoing and blended with instruction.

The review, the discussions, and the definition stimulated the selection of the topics to be addressed in the seven commissioned papers published in this volume. These commissioned papers, authored by several eminent scholars, are designed to clarify and amplify specific aspects of CT&L. Although these commissioned papers are not an exhaustive discussion of all aspects of contextual teaching and learning, they do provide a solid foundation upon which to design preservice teacher education programs that focus on preparing teachers who, as John Dewey suggested, help students learn by engaging in meaningful activities. These commissioned papers were reviewed and responded to by informed teacher educators and researchers in a session held just after the 1998 American Educational Research Association national conference. These same experts and others experienced with CT&L concepts also met for 2 days in May 1998 at a Design Conference intended to develop a "Framework" to further ground the concept of CT&L and to guide the subsequent selection and study of teacher preparation programs where CT&L attributes are exemplified. Five such programs were selected for study.

A Framework for the Study of Contextual Teaching and Learning in Preservice Education

As a part of this project, a framework or template has been developed to provide a structure for the further study of contextual teaching and learning in preservice teacher education programs so that, through full explication and identification of examples from practice, educators' thinking on this topic can be advanced. The framework emerged from the integration of information gleaned from a review of the teacher education literature, the seven commissioned papers that appear in this volume, and comments and suggestions from experts attending the Design Conference. This framework, depicted in figure 1, has two dimensions: (1) the characteristics of contextual teaching and learning and (2) the program components that need to be present in all effective teacher education program. Each dimension and its characteristics or component parts are described in greater detail in the following paragraphs.

	Components of Teacher Education										
Characteristics of Contextual Teaching and Learning	Goals	Curriculum	**Instructional strategies**	**Contexts: workplaces, classrooms, clinics, schools, community**	Learners	Staff	Themes	**Ethos**	**Partnerships**	**Regulations**	**Location**
Is problem based											
Occurs in multiple contexts (schools, homes, worksites, communities)											
Fosters self-regulated learning											
Anchors teaching and learning in students' diverse life contexts											
Employs authentic assessment											
Uses interdependent learning groups											

Figure 1. A framework for contextual teaching and learning in preservice education

Characteristics of CT&L

The characteristics of contextual teaching and learning include teaching and learning that—

- is problem based;
- fosters self-regulation;
- occurs in multiple settings or contexts;
- anchors teaching and learning in students' diverse life contexts;
- uses teams or interdependent group structures so students can learn from each other; and
- employs authentic assessment and multiple methods for assessing student achievement.

These characteristics are briefly defined as follows:

Problem-Based Learning. Problem-based learning is a strategy that begins by confronting students with a simulated or real problem. As students wrestle with a problem, they begin to realize that it can be viewed from very different perspectives and, that to resolve the problem, they need to integrate information from various disciplines (Pierce and Jones, in this volume). As students assume the roles of stakeholders who are affected by the resolution of the problem, they engage in higher-level thinking and problem solving.

Multiple Contexts. Learning in multiple contexts draws upon current theories of cognition and learning suggesting that knowledge and learning are considered to be situated in particular physical and social contexts (Borko and Putnam, in this volume). In fact, theories of situated cognition assume that knowledge is inseparable from the contexts and activities within which it develops. Thus, how a person learns a particular set of knowledge and skills, and the situation in which a person learns, are a fundamental part of what is learned. Thinking about cognition as situated implies that students should learn knowledge and skills in meaningful contexts. Examples of meaningful contexts include families; community sites such as museums, historical societies, libraries, etc.; and worksites in business and industry.

Self-Regulated Learning (SRL). SRL includes three central characteristics: (1) awareness of thinking, (2) use of strategies, and (3) sustained motivation. Becoming self-regulated involves awareness of effective thinking and analyses of one's own thinking habits (Paris and Winograd, in this volume). Individuals can learn how to engage in self-observation, self-evaluation, and self-reaction to guide the plans they make, the strategies they select, and evaluation of their performances. A second aspect of SRL includes an individual's repertoire of strategies for learning, studying, controlling emotions, etc. Third, students' motivation influences choices they make and effort they expend. SRL involves motivation decisions about the goal of an activity, its perceived difficulty and value, self-perceptions of the learner's ability to accomplish the goal, and the perceived benefit of success or liability of failure. Thus, SRL has the potential to be a set of attitudes, strategies, and motivations for increasing meaningful engagement as well as the potential for decreasing engagement in learning.

Teaching and Learning Anchored in Students' Diverse Life Contexts. Students are part of the context in which teachers teach. Today's students reflect the values and mores of different cultures and of cultures different from that of the majority of white, middle-class teachers. Students' cultural and social context is an important link to their achievement. Because it is an inherent and deep structural context, it automatically informs and connects to all learning. It can, therefore, be used as an instructional platform to allow students to move from what they know to what they do not know.

Authentic Assessment. CT&L includes assessment that is derived from multiple sources and is ongoing and blended with instruction. Authentic assessment samples the actual knowledge, skills, and dispositions desired as they are used in teaching and learning contexts. Multiple sources of evidence of learning are collected over time and in multiple contexts. The assessment practice includes multiple student opportunities for learning and practicing the desired outcomes and for feedback and assessment.

Interdependent Learning Groups. Learning activities occurring in various contexts are usually social—they involve other people. Interactions with learners in one's environment may be major determinants of what is learned and how learning occurs. Engagement in cooperative learning structures such as cohort groups appears to be an ideal means of encouraging interdependent learning.

Components of Effective Teacher Education Programs

The components of teacher education programs that are employed in the framework were distilled from the work of Howey and

Zimpher (1989) and, to a lesser extent, Katz and Rahts (1982). Questions have been raised about the seriousness given to "programs" in teacher education. Howey and Zimpher (1989) point out that program approval is the primary means by which institutions are legally authorized to prepare teachers. However, in general, little careful and systematic thought appears to have been given to the concept of program beyond the knowledge and skills embedded in a set of courses assumed to be limited by a set of regulations. Teacher education and teacher educators can do better than they have in the past. A secondary benefit of this project is to call more attention to the nature and definition of "program"; to this end, components that comprise a teacher education programs are described and will be used as part of the framework from which to identify contextual teaching and learning strategies. Therefore, a program is more than a series of courses. The authors maintain that the following components should be considered when designing effective teacher education programs:

- **Goals:** the mission, values, and objectives of the teacher education program;
- **Curriculum:** the skills, competencies, philosophical principles, and academic disciplines transmitted to students via the activities and events constituting the teacher education program;
- **Instructional Strategies:** the instructional techniques and approaches modeled by the faculty and as well as taught to preservice teachers;
- **Contexts:** the various contexts (classrooms, laboratories, community, workplaces) in which the student learning occurs;
- **Learners:** preservice student characteristics such as age, sex, socioeconomic status, intellectual ability, ethnicity, and any other characteristic that can be thought to be related to the nature and outcome of teacher education programs;
- **Staff:** characteristics (age, education, ethnicity) of the faculty, classroom teachers, and other staff connected with the teacher education program;
- **Themes:** threads that tie key concepts together throughout a variety of courses, practica, and school experiences. Themes can take on the nature of a primary conception of learning how to teach or can articulated in terms of a basic respect for something such as individual diversity;
- **Ethos:** the intellectual and social climate or atmosphere of the program;
- **Partnerships:** planned relationships with other agencies or institutions to further shared goals and values;
- **Regulations:** the laws, regulations, legal restrictions and stipulations related to teacher education and certification as well as

the requirements of school districts, local educational authorities, national certifying bodies, etc;
- **Location:** the location of a teacher education program on a conventional campus, urban commuter campus, a teachers' center, campus laboratory school, etc. and the type of the location (urban, rural, suburban).

Using these program components as building blocks, teacher education programs first must explicate, justify, and build consensus around such fundamental conceptions as the role of the teacher, the nature of teaching and learning, and the mission of schools in a democracy. Program goals and mission guide not only the nature of the curriculum as manifested in individual courses but also questions of scope; developmental sequence; integration of discrete disciplines; and the relationships of pedagogical knowledge to learning how to teach in various laboratory, clinical, school, community and workplace contexts. Effective programs establish priorities in terms of key dispositional attitudes and behaviors enabled and monitored in repeated, structured experiences. Effective programs reflect consideration of ethos and culture building among students and collegial relationships both between and among faculty and students and those who assume responsibilities for teacher preparation in K-12 schools. Effective programs contribute to more mutual endeavors in research and evaluation beyond the individual course level. Various student cohort arrangements and other temporary social systems such as inquiry teams or cooperative learning structures should also be considered. The project team sees this "robust" conception of "program" as a necessary part of the framework from which to identify contextual teaching and learning strategies.

In summary, using the term "program" in the robust manner previously described, combined with the definition of contextual teaching and learning informed by a review of the literature, the seven commissioned papers, and the views of experts attending the Design Conference, the project team concluded that the five teacher education programs to be studied more fully must provide evidence that they teach and model these CT&L characteristics:

A contextual teaching and learning teacher education program that—

- is problem-focused and/or develops student problem-solving abilities;
- uses multiple real-life contexts such as workplaces and the community in which to teach and foster learning;
- addresses learning as situated, social-cultural, and distributed;

- fosters self-regulated learners;
- anchors teaching and learning in students' diverse life contexts;
- employs ongoing and blended assessment of student achievement and employs multiple methods for assessing student achievement;
- uses interdependent learning groups so students can learn from each other; and
- models contextual teaching and learning strategies.

Implications for Teacher Education

The renewed interest in contextual teaching and learning has obvious implications for teacher education. If cognition is situated in particular contexts, then learning experiences for students who are prospective teachers should be situated, as much as possible, in a variety of appropriate contexts. Courses in preservice teacher education and field experiences provide the opportunity for planned instruction in meaningful contexts such as homes, classrooms, workplaces and the community. Clearly, if teachers are to use contextual teaching and learning, then they must themselves have the opportunity to experience teacher education programs that model contextual teaching and learning. Further, if teachers are to use CT&L then they must learn to plan instructional experiences that engage their students in a variety of realistic contexts and in situations that connect with their students' prior knowledge and ways of knowing. What would a teacher education program preparing preservice teachers to use contextual teaching and learning look like?

> “If teachers are to use contextual teaching and learning, then they must themselves have the opportunity to experience teacher education programs that model contextual teaching and learning.”

A Vignette for Illustrative Purposes

To help readers better understand the conception of the program and the characteristics of CT&L described in the preceding paragraphs, the following vignette describes a hypothetical CT&L preservice teacher education program.

Hersh University is a private regional university in Illinois. With 8,000 students, it is the third-largest private institution in the state with the second-largest teacher preparation program among the private institutions. Two thousand students list education as their major and the College of Education has 45 full-time faculty members. The university was established in 1902 with endowment funds from the Hersh family. It is the only independent (nonchurch affiliated) private institution in the Illinois. In 1927 it merged with the nearby Cozwell Normal School and began preparing teachers.

In the **mission statement** of the University, the school defines itself as "a career-oriented, liberal arts institution." As one reads the mission statement and studies the programs and demographics of Hersh, it is apparent that the emphasis is on "career-oriented" rather than liberal arts. The university is composed of six colleges. They include the colleges of Arts and Sciences, Education, Fine Arts, Business, Allied Medical Professions, and Behavioral Science. Business is the largest college in the university, and Education is the second largest. Each of the colleges has a dean who reports to the provost. The dean of the College of Education, Laura Turner, was appointed 5 years ago. During her second year, in response to a request for more efficiency within the university, Dean Turner began a restructuring program.

Goals. A series of weekly forums brought the faculty together with selected staff members and students. The purpose of the forums was to build consensus around a new mission statement and a set of goals and objectives. Building upon the career-orientation of the University, the mission that evolved became one that embraced Contextual Teaching and Learning at its core. The goals of the College were to prepare teachers and other educational personnel who would practice **problem-based learning strategies and foster self-regulated learning** in their students. They would encourage the teachers to engage in higher-order thinking and learn the skills needed to teach students from different cultural and socioeconomic backgrounds.

Teachers prepared at Hersh would use the community as the classroom and ensure that learning occurred in **multiple contexts**. Not only would teachers use the community, they and their students would serve the community. Teachers would use strategies and instructional techniques that are inclusive of all children, including multiple assessment strategies and interdependent learning groups to encourage learning from each other. These activities are designed to meet the mission of preparing teachers who prepare students for the world of work.

Curriculum. The program's mission is expressed throughout the curriculum where contextual teaching and learning is evident. It can be seen in the description for each program area where it is expected that faculty will list the specific classes in which problem-based learning, self-regulated learning, and higher-order thinking strategies are taught. A perusal of the syllabi indicates that at least two classes in each program area emphasize these skills. Each instructor is also required to include the contexts in which learning takes place on the syllabus. The program area coordinator is expected to examine the syllabi across the program areas to ensure that each certification student participates in home-based or community-based instruction and is involved in a class with a service learning component through each year of the program. The **themes** of learning in multiple contexts and service learning are ones that permeate the entire program.

A unique aspect of the Hersh curriculum is the work-based intersession. After students are admitted to the teacher education program, they are required to spend one of three intersessions (a 4-week term between Fall and Spring semester) interning for a business or agency that has committed to work with the students. Faculty in the teacher education program had developed **partnerships** with several local businesses and industries. The purpose of the internship is to provide the "real-world" examples that prospective teachers can translate into lesson plans. An examination of student teacher portfolios provided an example from a mathematics education student who worked as an intern at the Honda plant and was able to incorporate her experiences into the math problems written for her methods class. Rather than using problems from a textbook, the preservice teacher developed a case study based upon the production and employment data from the plant. The high school students were asked to use the data to determine the production cost of an automobile. In a related activity, students visited several showrooms to find out the price of the car to the consumer. A social studies internship at a travel agency led to a lesson plan that included a group of students planning individual itineraries for tours of Europe, Asia, and Africa.

When the curriculum was being developed, faculty members studied other programs and brought in experts in areas of particular interest. **Infusing issues of equity and diversity** into the program was one such area. It was decided that multiple methods were needed. Developing a stand-alone course that included readings and discussions of the students' own culture along with other cultures was to be the initial step. The second part of the program was an examination of every course in the curriculum to determine how issues of equity and diversity could be included in each. The minutes from these meetings indicate that faculty from all but three courses found some means of including equity and/or diversity topics in the class. The third part revolved around the field placements. The director of field services provided detailed information about the ethnic, cultural, and socioeconomic make-up of each field site. The majority of the student's time in the field (whether in school sites or community sites) was to be spent in a placement where the student population was significantly different from the population of the school that the student had attended. Clearly, the **ethos** of the program was respect for equity and diversity, and students reported an increasing understanding and admiration for cultures different from theirs.

Instructional Strategies. The faculty agreed that in most instances, the best way to teach instructional strategies is to model them in the classroom. The following information is gleaned from observations of classes at Hersh.

College of Education: Field Notes

Education 304: General Methods. This course is required of all secondary teacher education students. In the observed class, the 18 students have been divided into 3 groups of 6. Since the beginning of the semester they have been working with their own "class" of students. The instructor gave thema folder with the profiles of each student in the simulated class and each week he provides a new scenario for the group to address. Students play a different role each week. During the observation the students in Group A are discussing an upcoming parent conference. Two students in the group have taken the role of teachers, a third student is the principal, another is the school counselor, and the last two are to play the role of the parents. The conference has been called because the parents have received word that the student will not be eligible for an athletic contest. The teacher preparation students have looked up the student's profile, written a contact plan, provided an outline for the conference and will do a mock conference during the class. This class does not use a textbook. Students are expected to find resources to solve the problems presented each week. In some instances the resource may be a textbook; in this example it may be an interview with school counselors, coaches, parents, or students. Most of the schools and community agencies have opened up their files to the students so they too can be used as resources. Students are learning to see their students in the contexts from which they come.

College of Arts and Sciences: Field Notes

Mathematics 302. This upper division math course is required for all students preparing to teach math in middle school or secondary school. Each student is required to assemble a portfolio of his/her best work each week. During the seventh week, students are to write a paper that describes why they chose the pieces for the portfolio and what they learned from each piece. The portfolio assignment provides feedback for the instructor and is included in the summative grade for the student. In addition to serving as an assessment, the portfolio helps students integrate writing and math.

Psychology 202. This course is a required course for all Education students. In the observed class, students are working with preschool children at a work-based day care center. The preschoolers come from a variety of racial and ethnic backgrounds. The psychology students have been assigned to replicate one of Piaget's experiments with several of the students from different backgrounds. They are to describe what if any differences exist.

Physics 101. This class has been meeting at a local amusement park for the past three sessions. The students are working with the designer of a roller coaster and building models that could improve those that are in the park. They plan to meet with the local park and recreation department and present their ideas for improving the park.

Faculty/Staff. The faculty and staff of Hersh are extraordinary. Many of the faculty have had at least 5 years of teaching in public schools—most in urban areas. Although excellent researchers, they understand the importance of modeling effective teaching in order to prepare effective teachers. Thus, they plan courses together and provide feedback to each other about the effectiveness of their own teaching. Although this intensive planning certainly has taken more time, the faculty displays a high level of morale emanating from the belief they are accomplishing something worthwhile—preparing highly effective teachers. The faculty were relieved when the University's promotion and tenure **regulations** were decentralized with the departments and colleges having the authority largely to determine who received tenure and promotion. Now their research and scholarship could focus on teacher education and they could continue to learn and improve their own preparation of effective teachers.

Students. Students enrolled in the education program at Hersh University participated in a rigorous selection process. Although the required grade point average is 2.75, the average grade point average for the most recent class was 3.2. Students also are required to take a basic skills test and a test of content knowledge. They are asked to submit a writing sample and they are interviewed by three faculty members. To ensure a diverse student body, Hersh University has developed an articulation agreement with a nearby community college that enrolls a large number of African-American and Latino students. Students who maintain a 3.0 GPA are eligible for scholarships for their junior and senior year as well as for the graduate program.

The admissions committee has developed a recommendation format that differs from most other universities. In addition to addressing the student's academic achievement, those making recommendations are asked to address how well students interact with peers in group situations, the kind of role they play in a team situation, their ability to solve novel problems, and their experiences with various agencies in the community. In addition to experience with children, students are expected to have involvement with community service. These criteria have led to a student body that has thrived and experienced success in the program.

Assumptions and Next Steps of the CT&L Project

The Project Core Team composed of faculty from the Ohio State University (Sears, Howey, and DeStefano) and Bowling Green State University (Berns), building on the contract funded by the Office of Vocational and Adult Education and the National School-to-Work Office, have emphasized several important propositions in their work:

- What teachers know and can do is the most important influence on what students learn, *when* teachers know how to effect potent forms of contextual learning.
- Preparing and continuing to provide growth opportunities for teachers is the central strategy for *improving* schools and student achievement *when* teacher educators (campus and school based) can model such contextual teaching themselves and enable such teaching and learning in others.
- School reform will be achieved when conditions evolve in which teachers can teach in this manner. However, this will only occur *when* teachers themselves bring to their teaching new understandings, skills, and dispositions. Only then will changes occur in the structure and organization of schools.

Ambitious forms of teaching and learning demand new contexts and conditions in and out of school, not the other way around. Changing conditions in schools, such as finding more time for teachers to plan together, hardly ensure new forms of instruction. The focus is foremost and rightfully so on a more potent conception of teaching and learning.

Currently, five preservice teacher education programs that exemplify aspects of CT&L are being studied and case studies of these five programs will be completed. The commissioned papers in this volume, the proceedings of the 1998 Design Conference, the Framework, and the five case studies will be disseminated through multiple outlets including a website (http://www.contexual.org), the ERIC database, and national conferences (e.g., American Vocational Association and American Association of Colleges for Teacher Education) as well as through appropriate national teacher preparation reform networks such as the Holmes Partnership and the Urban Network to Improve Teacher Education.

As contextual teaching and learning is studied further by teacher educators and teachers and as their findings are shared across the field, the ultimate beneficiaries should be students.

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Introduction to the Commissioned Papers

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Why Contextual Teaching and Learning?

Why the term *contextual* teaching and learning? The descriptor *contextual* was carefully selected because contemporary research, theory, and "best" practice have demonstrated that the construction of knowledge and learning do not typically develop independently in the mind of the individual but rather are situated within, and greatly influenced by, physical, social, cultural, and subject matter *context*. Cognitive acts—the process of thinking—are invariably responses to specific sets of circumstances defined by these *contextual* properties. Context is of course also defined by another critical dimension. The abstract, sterile, and inert nature of far too much instruction in classrooms is characterized by students listening to and recording information. This form of activity has been aptly referred to as "studenting" rather than learning. In these instances instruction appears to have little application to the students' lives and opportunities for rich learning outside of school in such *contexts* as the home, the neighborhood, the workplace, and the global community. The latter interactions can be achieved in a virtual sense through modern communications technology. Thus, exploiting new *contexts* for ambitious forms of learning out of as well as within school are also implicit in this evolving construct of CT&L.

Contextual Teaching and Learning: A Definition

We have tentatively defined CT&L in the following manner. Contextual teaching is teaching that enables learning in which students employ their academic understandings and abilities in a variety of in- and out-of-school contexts to solve simulated or real-world problems, both alone and with others. Activities in which teachers use contextual teaching strategies help students make connections with their roles and responsibilities as family members, citizens, students, and workers. Learning through and in these kinds of activities is commonly characterized as problem based, self-regulated, occurring in a variety of contexts including the community and work sites, involving teams or learning groups, and responsive to a host of diverse learner needs and interests. Further, contextual teaching and learning emphasizes higher-level thinking, knowledge transfer, and the collection, analysis, and synthesis of information from multiple sources and viewpoints. CT&L includes authentic assessment, which is derived from multiple sources, ongoing, and blended with instruction.

This evolving construct of contextual teaching and learning has far-reaching ramifications. It can, and from this perspective should, guide the design of programs of teacher preparation. It should also guide the fuller development of an interrelated set of instructional strategies that all teachers should have in their repertoire. Finally, this construct should guide materials development and instructional activities for students themselves to enhance their ability to regulate and monitor their learning. This should begin in the early years of school with parental involvement.

Although high student achievement is critically important, the ultimate goal for schools is to produce students who have the ability and desire to learn and solve problems in a variety of complex *contexts* throughout their lifetime, a daunting challenge indeed but our proper target. Greater clarity and agreement about what constitutes such learning is needed, however, before it can be achieved.

The Pervasive Social Nature of Learning

Contextual learning is first and foremost an active problem-solving process and often a *collaborative* one. It calls for the disposition and ability to examine in a continuing manner how one is "learning." Good learners both critically examine the effort they put forth and the specific procedures they employ in their learning. Learning, especially in academic settings, is also very much a social and community endeavor; therefore, CT&L commonly calls for thinking "out loud" and sharing with others how one is going about solving problems and arriving at conclusions. Thus, members of a "learning community" understand what responsibility they have not only for their own learning but also their responsibility for assisting others in their learning as well. Thus, in this ambitious view of learning both the effort individuals put into tasks and the specific strategies they employ to learn are monitored at different times by the teacher, the class, or the learning community, as well as by the individual. Academic learning is mediated in powerful ways by the community and the workplace.

An emphasis on students taking more responsibility for their success in schools, both as individuals and as group members, and cooperating to address challenges reflects the kind of society we desire: one in which individuals work and play together in productive and harmonious fashion. Public schools in this democratic society are for promoting cognitive growth but they are also for gaining marketable skills in the workplace and developing good citizens. What is not stressed enough is how much learning for the latter two goals promotes the former goal, that which is commonly considered as "academic" learning. Obviously, individuals vary in different cognitive abilities, although most of us have high ability in at least one domain. Learning with and from others is not a case of the "gifted" teaching the "not so gifted." There are always things students can teach one another. All of us have different prior knowledge and special interests and experiences that can inform others. Whatever a student's ability, when she or he has to teach something to someone else, what they know or think they know comes under others' scrutiny as well as their own. Thus, when sharing *what we think we know* with others, our potential learning can be enriched in two ways: first, as we attempt to teach something we think we know to someone else, we can get immediate feedback on the clarity and efficacy of what we share and the manner in which we do it. Second, we can also learn how to cooperate with others, especially those different than we are or who disagree with us. Thus, we acquire new perspectives.

In our diverse democratic society we have not capitalized nearly as well as we should have and can on schools as the great storehouse for social as well as cognitive learning. If schools are serious about developing lifelong learners, who know *how* to learn, then students need repeated structured opportunities in and *out* of school to learn how to study and to learn *from* as well as with one another. The workplace today is often typified by collaborative problem solving and so also should be our schools and the contexts with which students interact. This point cannot be underscored strongly enough. Students are in powerful social settings in school, and far too many reform initiatives call for improved student achievement without sufficient attention to how youngsters actually learn *together*, as well as alone. When this powerful social and cultural dimension is not viewed as leverage for learning, and it is *not* in too many instances, students often find that their race, culture, or social station works against them. Thus, how teaching and learning take advantage of diversity and accommodate cultural differences is a central aspect of CT&L.

Underused Contexts

Contextual settings in *workplaces* of many types can reciprocally interact with and positively influence "academic" learning. Packer and Pines (1996) make the argument as follows:

> The use of more realistic workplace applications will result in better, more prepared learners and workers. This is particularly true of traditional applications in mathematics and science. Both the National Council of Teachers of Mathematics and the American Association for the Advancement of Science are encouraging the integration of examples of workplace problem solving into the academic standards they have established. More and more individuals are beginning to understand the natural applications in the world of work for academic curriculum. Although more data need to be collected on the learning outcomes of using an applied approach to teaching, many are starting to see that this connection strengthens the amount of knowledge that is learned, understood, and retained.

Further, "workplaces" exist for 5-year-olds just as they do for adolescents. Kitchens, gardens, yards, and playgrounds all present multiple opportunities for constructive work, just as the great range and variety of businesses and industries do for the older student.

Two other *contextual* settings warrant brief mention in terms of their great potential for enabling learning: that of the neighborhood and school community. In ***Common Purpose***, Lisbeth Shorr (1997) argues that we need to address complex problems from a systems perspective. Two key attributes of highly successful systems are that children are continually engaged with and understood in the *context* of their families and that families are, in turn, engaged with as integral parts of neighborhoods and communities. That much school learning is, in fact, divorced from these realities of student life and that many teachers neither live in nor understand well the cultures and community setting surrounding the school in which they teach is well documented (Sumara 1996). The sensitivity to youngsters and responsiveness in curriculum that derive from such *contextual* understandings are reflected in contemporary learning theory and supported by empirical data. For example, the first learner-centered principle put forth by the American Psychological Association (APA) (Alexander and Murphy 1998) is—

> One's existing knowledge serves as the foundation of all future learning by guiding organization and representations, by serving as a basis of association with new information, and by coloring and filtering all new experience (the knowledge base principle).

Gaining insights into youngsters' prior understandings and experiences demands some minimal engagement with their home and community context.

The Commissioned Papers and Their Purpose

The titles and authors of the commissioned papers in this volume are as follows:

The Role of Context in Teacher Learning and Teacher Education (Hilda Borko and Ralph T. Putnam)

Problem-Based Learning: Learning and Teaching in the Context of Problems (Jean W. Pierce and Beau Fly Jones)

Community Service Learning: Collaborating with the Community as a Context for Authentic Learning (Rahima C. Wade)

Preparing Preservice Teacher Education Students to Use Work-based Strategies to Improve Instruction (Richard L. Lynch and Dorothy Harnish)

Culturally Relevant Pedagogy in Contextual Teaching and Learning (Lauren Jones Young)

The Role of Self-Regulated Learning in Contextual Teaching: Principles and Practices for Teacher Preparation (Scott G. Paris and Peter Winograd)

Authentic Assessment of Teaching in Context (Linda Darling-Hammond and Jon Snyder)

Each paper was commissioned to illuminate a different aspect of contextual teaching and learning. For example, the paper by Borko and Putnam is intended to provide an overview of recent advances in cognitive learning theory and address especially the key role of *context* in teacher learning and teacher education. As does this introduction, it provides a backdrop for the remaining papers. The second APA learner-centered principle is that the ability to reflect upon and *regulate* one's thoughts and behaviors is essential to learning and development (the strategic processing principle), and the paper by Paris and Winograd focuses on the critical importance of strategic self-regulation within CT&L. Problem representation and problem solving are also core elements of CT&L, and Pierce and Jones' paper addresses key features of problem-based learning, both within and outside of teacher education. Deriving benefits from diversity, especially racial and cultural diversity, and addressing issues of equity are key aspects of any ambitious view of teaching and learning. Young elaborates on this in her paper, which discusses the preparation of teachers who can anchor instruction in the lives of their students outside of school. She reminds us that what is currently at stake is not just the narrow view of academic achievement as school mission but rather a school preparation that embraces DuBois's (1903) goals of work, culture, and freedom.

Two underused but common contexts rich with opportunities for problem-oriented, conceptual learning are the workplace and the community. Thus experts were identified who intimately understand these contexts. Lynch and Harnish were commissioned to address workplace strategies and Wade to give definition to the evolving notion of service learning, especially as the latter occurs in response to, and in collaboration with, community priorities. Finally, ambitious forms of assessment permeate the notion of CT&L and the rich insights of Darling-Hammond and Snyder were drawn upon to address the nature and effects of authentic assessment practices, especially in preservice teacher education.

Although each paper was commissioned to stand on its own, they have been placed in sequence so that the reader can examine them in their totality as well. This section now briefly draws attention to some of the core concepts and common themes within them to assist the reader in seeing the larger picture that guided the commissioning of the papers around these topics.

Current Perspectives of Cognition and Learning

The paper by Borko and Putnam is organized around three themes in current theories of cognition and learning: (1) cognition is situated; (2) cognition is often social in nature (especially in a social institution such as school); and (3) cognition is distributed across individuals and artifacts. What is especially helpful from the perspective of teacher educators is their suggestion that an empirical and theoretical base supports the view of teacher preparation or learning to teach as positive enculturation into various discourse communities or communities of practice. The concept of distinct learning or discourse *communities* is addressed in several of the papers. Paris and Winograd, for example, speak of collaborative innovation as a form of community. Pierce and Jones address communities of practice with a problem-resolution orientation; Wade refers to communities as defined by a culture of service; and the directions advocated by Young demand an emphasis on diversity-in-community. This stands in stark contrast to the *a*socialization and even negative enculturation of many prospective and beginning teachers when there is no school culture to model and reinforce the type of teaching and learning called for in this robust vision of CT&L.

These writers address ways this problem might be rectified and remind us again that the role of others in promoting learning is significant and goes considerably beyond providing stimulation and encouragement. Borko and Putnam state:

> Rather, interactions with the people in one's environment are major determinants of both what is learned and how learning takes place. This *sociocentric* perspective (Soltis 1981) represents a confluence of ideas from numerous disciplines, including philosophy, anthropology, sociology, psychology, linguistics, and literary theory. In psychology, much of the current emphasis on social aspects of learning and knowing has its basis in the work of Vygotsky (1978) and other Soviet activity theorists (Leont'ev 1981).

From this sociocentric perspective, what we take as knowledge and how we think and express ideas are the products of the interactions of groups of people over time (Soltis 1981). Individuals participate in numerous *discourse communities* (Fish 1980; Michaels and O'Connor 1990; Resnick 1991), ranging from scholarly disciplines such as science or history, to groups of people sharing a common interest, to various workplaces and professions. These discourse communities provide the cognitive tools—ideas, theories, and concepts—that individuals appropriate as their own through their personal efforts to make sense of experiences. An important part of what it means to become competent in a particular domain is to learn the forms of argument and discourse—the accepted ways of reasoning, acting, and valuing—within that disciplinary community.

There is a burgeoning literature on teacher discourse and reasoning as the bedrock of effective teaching. Borko and Putnam also remind us that we are only beginning to understand the role of teachers in classrooms characterized by the new kinds of discourse called for in CT&L.

Self-Regulated Learning

Paris and Winograd argue that there is a direct and central relationship between students' ability to monitor and manage their own learning and their teacher's ability to monitor his or her own reasoning about teaching. The teacher reasoning literature clearly shows that highly effective teachers develop increasingly powerful warrants to guide and defend their teaching (Rentel 1994). What is especially helpful in their chapter is their explication of specific attributes of self-regulated learning (SRL), which is a key aspect of contextual teaching and learning (CT&L). For example, one of the central characteristics of self-regulation is motivation, and Paris and Winograd elaborate:

> The third characteristic of SRL is motivation because learning requires effort and choices. . . . Paris and Cross (1983) argue that ordinary learning fuses skill and will together in self-directed action. SRL involves motivation-related decisions about the goal of an activity, the perceived difficulty and value of the task, the self-perceptions of the learner's ability to accomplish the task, and the potential benefit of success or liability of failure. Awareness and reflection can lead to a variety of actions depending on the motivation of the person. . . . SRL has been characterized as a positive set of attitudes, strategies, and motivations for enhancing thoughtful engagement with tasks, but students can also be self-directed to avoid learning or to minimize challenges. . . . In our view, teachers need to understand students' motivation in order to understand how they learn, what tasks they choose, and why they may display persistence and effort, or, conversely, avoidance and apathy.

These authors argue that acquiring these understandings and abilities that are embedded in CT&L will allow learners to become strategic by helping them discriminate readily between productive and counterproductive behaviors in learning. Prospective teachers need to employ such understanding and abilities in their *own* learning on a continuing basis if they expect their pupils to do this. Paris and Winograd call for ongoing participation by novice teachers in reflective *communities* to enhance the examination of their own self-regulation habits. They illustrate assessment procedures that would allow novice teachers to trace their development in these regards throughout their preparation program and beyond.

Problem-Based Learning

In their chapter on teaching and learning in the context of ill-defined problems, Pierce and Jones get quickly to the core of the matter in terms of CT&L. Context is essential because engagement and persistence in problems are greatly mediated by how *intimately* one is affected by the problem. Thus, abstract, *decontextualized* problems that ignore—or worse contradict—the reality of the students' world, will likely not engage them. They suggest that even when students are confronted with meaningful, albeit ill-structured problems, just what information should be made accessible to them, when, and in what manner become critical questions for teachers to address. Answers to such questions speak to our growing understanding of problem representation and problem definition. To be successful in a problem-based approach to learning, the strategic skills and understanding articulated by Paris and Winograd would obviously be most helpful. Problem-based learning, when viewed in its totality, is a rigorous and encompassing endeavor. Drawing on the research of Finkle, Pierce and Jones identify several elements of the approach:

- **Engagement:** (1) preparing for the role of being self-directed problem solvers who collaborate with others; (2) encountering a situation that invites students to find problems; and (3) searching for the nature of the problem while proposing hunches, action plans, etc.
- **Inquiry and investigation:** exploring a variety of ways of explaining events and implications of each and gathering and sharing information.
- **Performance:** presenting the findings.
- **Debriefing:** (1) examining costs and benefits of the solutions generated and (2) reflecting on the effectiveness of the whole approach to problem solving they have used.

Anchoring Instruction in the Lives of Students Outside of School

The vast majority of teachers entering the work force continue to be white, middle-class, monolingual, relatively young individuals who have had limited experiences with cultures other than the racially homogeneous setting in which they grew up. This profile stands in stark contrast to the ever-increasingly more diverse student population in public schools and especially in large urban settings where the need for competent and caring teachers is great. Young underscores the magnitude of the situation in her paper:

> Despite contributions to U.S. culture, and the learning opportunities for inclusion presented by this pluralism, insidious systemic inequities—social, political, economic—continue to exacerbate institutional and individual inequities. The list is long: racist attitudes and expectations; inequitable financing of schools; biases in textbooks and instructional materials; disproportionate assignments to tracked classrooms and ability groups; and unfair differences in curricular, technology, and human resources and in conditions of the physical plant, in class and school sizes, and in other measures of school quality.

Young goes on to demonstrate how novice teachers (and I would add as well many veteran teachers and teacher educators) who have lived their lives in isolation from people of color and distant from neighborhoods with concentrations of poverty often hold cultural assumptions linking differences among students from these settings to "deficiency and dysfunctionality." Young identifies general principles to illustrate how teacher preparation programs might be designed to combat such ignorance and bias. She argues persuasively that teacher education be grounded in a concept of *generative abilities*. This implies teachers learning how to teach over time by continually and purposefully drawing from the insights of their diverse students, colleagues, and communities. This is a premise wholly consistent with and central to CT&L, which stresses learning to learn over time in a variety of contexts.

The Community as Context and Service Learning

Service learning is a variation on community service, a long-standing tradition in our society. It is also a concept that when properly structured and pursued can understandably contribute to the generative disposition and related abilities called for by Young. In developing a rationale for service learning to be integrated more fully into teacher education, Wade underscores the many opportunities in service activities for prospective teachers to come to know and appreciate children and families from other cultures and she shares this definition of service learning:

> A method through which young people learn and develop through active participation in thoughtfully organized service experiences that meet actual community needs and that are coordinated in collaboration with the school and community; that are integrated into each young person's academic curriculum; that provide structured time for a young person to think, talk, and write about what he/she did and saw during the actual service activity; that provide young people with opportunities to use newly acquired academic skills and knowledge in real-life situations in their own communities; that enhance what is taught in the school by extending student learning beyond the classroom and that help to foster the development of a sense of caring for others (ASLER 1993, p. 1).

Consistent with CT&L, service learning is not viewed as a "charitable" extracurricular activity but rather a planned and purposeful pedagogical method in which service activities can provide a periodic and necessary experiential component of mainstream academic inquiry. Even if service learning can avoid the inherent tendency to provide occasional help to the "helpless" and become rather an integral part of instruction offered in PreK-12 classrooms, much work remains to be done. Wade acknowledges this challenge and the necessity of service learning practice in PreK-12 classrooms if it is to become part of teacher education on any widespread scale. Efforts to enhance the development of service learning in teacher education cannot exist apart from the fostering of service learning as an essential practice in the nation's classrooms.

Education and the Workplace

Just as community contexts are underused in school learning, so too are those of the workplace. In fact, the concepts of work and workplace are foreign to many youngsters, especially on both ends of the socioeconomic spectrum, that is, both those youngsters with a great many resources but little if any responsibility beyond orthodox school "work" in their formative years and those who reside in poverty-concentrated neighborhoods. In both instances there is little visible employment opportunity close at hand and in the latter situation there is a paucity of adult male workers to model because of the systemic dislocation of economic opportunity. The lack of common skills and understandings that are needed to be successful in different work situations and an appreciation of how workplace experience can give needed meaning to key school learning are widespread problems. Even more critical is a fundamental lack of understanding of the nature, necessity, and dignity of work itself and on a broad scale for many youngsters in their formative years.

Eventually, the great majority of high school seniors (80%) and postsecondary students (77%) do work while pursuing their studies and those who do work a moderate number of hours per week perform better academically than those who do not. However, and perhaps understandably, those who work a higher number of hours do less well academically (Phelps 1998). One could reasonably infer from this that there are ample work opportunities for youth and that they appear often to have salutary effects on school performance—even with no planned integrative structures with the school curriculum. Learning experiences where work opportunities are tied to school appear vastly underdeveloped and thus have considerable potential.

Thus, Lynch and Harnish in their chapter, just as Wade in hers, underscore the supporting infrastructure and professional development that will be needed to strengthen school-to-work linkages. There are positive directions in this regard as both the National Council of Teachers of Mathematics and the American Association for the Advancement of Science are promulgating interactions between workplace and school in their new curriculum standards. Recent federal legislation has also spawned positive innovations, especially the School-to-Work Opportunities Act of 1994. However, whether supportive infrastructures that have been put in place to improve students' career orientation and occupational development and integrated more fully with their general intellectual and academic developments will stand the test of time will be a key concern as funding for STW winds down. Nonetheless, these recent initiatives have led to an evolving understanding of work-based learning (WBL). Lynch and Harnish review that literature and offer this formative definition:

> Work-based learning is an educational approach that uses workplaces to structure learning experiences that contribute to the intellectual, social, academic, and career development of students and supplements these with school activities that apply, reinforce, refine, or extend the learning that occurs at a work site. By so doing, students develop

attitudes, knowledge, skills, insights, habits, and associations from both work and school experiences and are able to connect learning with real-life work activities.

Again WBL is viewed by these authors as an *instructional* strategy that is intended—just as service learning—to strengthen the academic learning and intellectual development of youngsters at all ages by providing necessary *contexts* in which core understandings and skills can be applied, deepened, and refined. At the same time WBL provides needed understanding and appreciation of and engagement with various kinds of work and with various occupational settings. Fully manifested, it can also help address major inequalities in society by assisting in raising questions about which job and career opportunities are made available for which individuals and in which specific neighborhood and community contexts.

Blended and Authentic Assessment

The chapter by Darling-Hammond and Snyder addresses "authentic" teaching assessment practices in preservice preparation. Instruction that is contextually oriented treats assessment as an ongoing activity blended with and continually informing both teacher and student. Multiple forms of authentic assessment over time are an essential, defining attribute of CT&L. The authors outline the conditions that must be met for assessment procedures to be contextualized and authentic:

- Assessments sample the actual knowledge, skills, and dispositions desired of teachers as they are used in teaching and learning contexts rather than relying on more remote proxies.
- As they are used in practice and integrated into prospective teachers' ongoing learning opportunities, assessments require the integration of multiple kinds of knowledge and skill.
- Multiple sources of evidence are collected over time and in multiple contexts.
- The assessment practice includes multiple opportunities for students to learn and practice the desired outcomes and multiple opportunities for feedback and reflection.

In their provocative paper Darling-Hammond and Snyder also identify four distinctive, if at times overlapping, assessment tools: cases, portfolios, variations on action research, and school change projects. They suggest that these four instructional approaches relate directly to four core roles assumed by teachers: teacher as decision maker, teacher and teaching as artistry, teacher as social scientist, and teacher as moral change agent. The term *classroom* *teacher* has taken on an apologetic and defensive posture, understandably in light of mounting criticisms of schools. This term in many respects is also constraining and archaic. As these authors point out, the professional teacher does take on many roles and in many *contexts* beyond the four walls of the classroom. The multiple responsibilities of a teacher and the complexities of teaching need to be demonstrated more visibly and communicated more cogently. Again, a bolder vision of teaching and learning is a precondition to a bolder vision of teacher education and school renewal. The seven commissioned chapters in this volume clearly illuminate the considerable body of knowledge that undergirds rich and rigorous forms of learning and hence teaching. This concept of *contextual* teaching and learning commonly carries these activities beyond the confines of the classroom and school and places teachers squarely in the posture of not only inquiring into their own practice (often with their students) but into conditions in the home, community, and workplace.

Summary

This evolving construct of contextual teaching and learning should provide us a bolder, broader vision of not only of teaching and learning but of teacher education. The term *contextual* teaching and learning from this vantage point seems both a most appropriate term and a timely concept. The chapters that follow demonstrate that *context* is a multidimensional construct, denoting much more than physical properties or geographic location, and they underscore the key factors that so strongly influence the nature and the extent of both pupil and teacher learning. This emerging construct points the direction both for how instruction can be conducted differently *in* school, and increasingly *out of* school as well, especially for diverse communities of learners to learn from and support one another.

> **“Powerful, long-standing norms and conventions in our schools and contradictory beliefs about the nature of teaching and learning serve as major roadblocks to achieving this robust view of teaching and learning.”**

However, powerful, long-standing norms and conventions in our schools and contradictory beliefs about the nature of teaching and learning serve as major roadblocks to achieving this robust view of teaching and learning. These oppositional beliefs exist not only in the general public and the broader policy area, but also within the education profession. A clearer vision of CT&L, as articulated in the following chapters, will help. Ultimately, however, it is a question of who holds the vision. It is those teachers on the firing line, in the classrooms, whose vision and beliefs about teaching and learning will ultimately determine future directions in our schools.

That is why major changes in the initial education of teachers—as called for in this project—are needed so that future teachers are armed with a new vision of teaching and learning and one that they can *demonstrate*. Thus, following these chapters, this writer briefly addresses some of the problems that need to be addressed and issues to be resolved if contextual teaching and learning is to become more of a reality in our preservice preparation programs and in our public schools.

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The Role of Context in Teacher Learning and Teacher Education

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For most of this century educators have struggled in various ways with trying to make what children learn in school more accessible and useful in other contexts. Some students, parents, and employers perceive that schools do not teach content that is relevant to the rest of work and life in society. Others feel that "school learning" is too abstract and removed from the rest of life. Concerns such as these have led to the criticism that teachers and schools do not provide students with useful preparation for work and life.

In 1929, Whitehead complained about schools producing too much *inert knowledge*—with students knowing definitions of concepts but not being able to use the concepts when appropriate. More recently, Lauren Resnick (1987) argued in her presidential address to the American Educational Research Association that "as long as school focuses mainly on individual forms of competence, on tool-free performance, and on decontextualized skills, educating people to be good learners in school settings alone may not be sufficient to help them become strong out-of-school learners" (p. 18).

Educators have addressed these concerns about the irrelevance and inappropriateness of school learning in numerous ways over time. Educational psychologist E. L Thorndike (1922), for example, approached the problem as one of content. Thorndike, who viewed learning as the systematic accumulation of stimulus-response bonds acquired through practice, argued that the knowledge and skills students practice in school should be those that people in society actually use and value, not abstract subjects such as Latin, which at the time were believed to "exercise" the intellect. In keeping with this argument, Thorndike conducted a detailed analysis of the arithmetic skills used in everyday life and used this analysis as the basis for his recommendations regarding the arithmetic curriculum in elementary schools. At roughly the same time, John Dewey (1916) argued that schools should be more like the rest of life—that they should be places where people learn by engaging in meaningful and purposeful activities rather than places where students rehearse abstract content transmitted by teachers and textbooks.

More recently, the educational research community has seen a renewed interest in how learning in schools might be better contextualized or situated in meaningful settings so that the resultant knowledge is indeed more accessible and useful to students when they leave school. Much of this discussion about context is intertwined with new (or at least rediscovered) ideas about the nature of cognition and learning. Terms such as *situated cognition*, *authentic activities*, *distributed cognition*, and *communities of practice* are currently in vogue. All these concepts are attempts to acknowledge and address the role of context in learning. How, for example, can we specify the particular skills that students will need in their adult lives and work when society is changing so rapidly that the needed skills are certain to change before students reach adulthood? How can we create in our classrooms contexts and experiences that will empower students to be continual learners and problem solvers throughout their lives?

In this paper we examine current perspectives on what it means for learning to be contextualized or situated, drawing largely on recent literature from the community of cognitive scientists, psychologists, educators, and others who have explored the nature of knowing and learning. Much of the discussion of these issues in the literature has focused on basic questions about how people learn and know and the implications of these views for schools and classrooms. In contrast, we emphasize the implications of these views for teachers and teacher education. What roles do teachers play in creating better contextualized learning environments for their students? How can focused attention on the contexts of learning help teacher educators support teachers in learning these new roles?

Teachers are essential players in any transformation of classrooms and schools. If we are to assist new teachers as they to learn to teach in ways that support contextualized learning, we must understand how teachers themselves learn and then incorporate this understanding into the design of teacher education programs.

We begin our discussion with a look at current theories regarding cognition and learning as activities that are situated, social, and distributed across individuals and tools. We then examine the implications of these theories for classrooms and teachers. Finally, we consider how current theories about contextualized learning can be applied to the practice of teacher education.

Current Theories of Cognition and Learning

Early cognitive theories assumed that a cognitive core of knowledge and skills exists in the mind of the individual, independent of context and intention. These theories typically treated cognitive processes rather mechanistically—as the manipulation of symbols inside the mind. Traditional instructional theories grounded in this perspective assumed that concepts and skills can be learned independently and that learning is facilitated by breaking complex tasks into component parts to be taught and practiced in isolation (e.g., Gagné 1985).

More recently, researchers have come to believe that cognition is a much more complex activity than once thought. Knowledge and learning are considered to be *situated* in particular physical and social contexts, challenging the view that knowledge exists in the mind of the individual, independent of its contexts of acquisition and use. Dissatisfied with overly individualistic accounts of learning and knowing, scholars are arguing for the importance of *social* and cultural factors in determining what and how we know and learn. Cognition is viewed, not solely as a property of individuals, but as *distributed* or "stretched over" (Lave 1988) the individual, other persons, and various artifacts such as physical and symbolic tools (Salomon 1993).

The propositions that cognition and learning are activities that are situated, social, and distributed are fairly recent arrivals on the research scene in North America, although they have roots in the thinking of educators and psychologists earlier in this century (e.g., Dewey 1916; Vygotsky 1978). Because of their implications for classroom practice and teacher education, we discuss each of these individually.

The Situated Nature of Cognition

Contemporary cognitive theorists are reconsidering the relationship between knowledge as it exists in the mind of the individual and the situations in which it is acquired and used (Brown, Collins, and Duguid 1989; Bruner 1990; Greeno, Collins, and Resnick 1996; Greeno and the Middle School Mathematics through Applications Project Group 1998).

Theories of situated cognition, which focus explicitly on this relationship, assume that knowledge is inseparable from the contexts and activities within which it develops. These theories posit that the physical and social context in which an activity takes place is an integral part of the activity and that the activity is an integral part of the learning that takes place within it. Thus, every cognitive act must be understood as a specific response to a specific set of circumstances (Resnick 1991). How a person learns a particular set of knowledge and skills and the situation in which a person learns become a fundamental part of what is learned. The "situatedness" of knowledge can be illustrated by the example of young street vendors who are able to perform sophisticated mental computations involving the items being sold but unable to perform similar or simpler computational tasks using the arithmetic procedures taught in school (Carraher, Carraher, and Schliemann 1983). Another example is the tight connection that exists between the mathematics used by workers in a modern dairy and the physical environment in which various dairy items are organized for delivery (Scribner 1984).

The emergence of the situated perspective has prompted renewed consideration of *transfer*—an important educational issue with a long history of debate from both theoretical and practical perspectives. According to traditional cognitive theorists who focus on the transfer of *knowledge* across tasks, transfer can occur only when an individual has developed an abstract representation of the knowledge that can be applied to multiple situations (Anderson, Reder, and Simon 1996, 1997). From the situated perspective, in contrast, *participation* in activity systems is key and transfer is possible when key features promoting and hindering participation are similar across situations—whether those situations occur in the school, the community, or the workplace (Greeno 1997; Greeno et al. 1996).

An extensive discussion of transfer is beyond the scope of this paper. It is important to note, however, that ideas about the relationship between traditional cognitive theories and situated cognition are still being developed and that the question of how knowledge transfers to new contexts is currently being debated within the scholarly community. Here we adopt the view that knowledge and learning are, at least to some extent, situated within specific contexts. When thinking of learning, knowing, and thinking as being situated in contexts, it is important to recognize that these contexts are largely *social.*

The Social Nature of Cognition

The impact of social influences on learning and the social contexts in which learning takes place have received increasing recognition in recent years. Learning—especially learning in school—has traditionally been considered a primarily individual activity in which students acquire, largely through repetition and practice, the knowledge and skills presented by teachers and textbooks. Even in some of the recent works written from a constructivist perspective, learning is regarded as a primarily individual, albeit active enterprise through which individuals make sense of the world by interpreting events through their existing knowledge and beliefs (Resnick 1991). The assumption that individuals actively construct knowledge is sometimes naively translated into a belief that powerful learning will take place through students' individual efforts to make sense of their experiences and a romantic pedagogical view that the teacher's role is simply one of facilitating students' explorations of the world (Cobb 1994a; Driver, Asoko, Leach, Mortimer, and Scott 1994; Prawat 1992).

Increasingly, however, psychologists and educators are recognizing that the role of others in the learning process goes beyond providing stimulation and encouragement for individual construction of knowledge (Resnick 1991). Rather, interactions with the people in one's environment are major determinants of both what is learned and how learning takes place. This *sociocentric* perspective (Soltis 1981) represents a confluence of ideas from numerous disciplines, including philosophy, anthropology, sociology, psychology, linguistics, and literary theory. In psychology, much of the current emphasis on social aspects of learning and knowing has its basis in the work of Vygotsky (1978) and other Soviet activity theorists (Leont'ev 1981).

From this sociocentric perspective, what we take as knowledge and how we think and express ideas are the products of the interactions of groups of people over time (Soltis 1981). Individuals participate in numerous types of *discourse communities* (Fish 1980; Michaels and O'Connor 1990; Resnick 1991) ranging from scholarly disciplines such as science or history to groups of people sharing a common interest to various workplaces and professions. These discourse communities provide the cognitive tools—ideas, theories, and concepts—that individuals appropriate as their own through their personal efforts to make sense of experiences. An important part of what it means to become competent in a particular domain is to learn the forms of argument and discourse—the accepted ways of reasoning, acting, and valuing—within that disciplinary community. Learning science, for example, entails "entering into a different way of thinking about and explaining the natural world; becoming socialized to a greater or lesser extent into the practices of the scientific community with its particular purposes, ways of seeing, and ways of supporting its knowledge claims" (Driver et al. 1994, p. 8). Similarly, becoming a physician, an accountant, or a chef entails learning to think like and with the professionals in the field. Thus, what we learn—what we take as knowledge—is fundamentally social.

The *process* of learning is also social. The role of other people, especially more knowledgeable others such as parents or teachers, varies across views of learning. In the implicit theories of learning that underlie much of traditional school practice, more knowledgeable others (i.e., teachers) typically are viewed as a source of the knowledge that is presented or transmitted to learners. From an individual constructivist perspective, interactions with other people are a source of disequilibration (Piaget 1985), the driving force for individual development. In contrast, sociocultural theorists conceptualize learning as participating more fully in the discourse and practices of a particular community while simultaneously contributing to the growth and change of that community (e.g., Cobb 1994b). From this view, learning is as much a matter of enculturation into a community's ways of thinking and dispositions as it is a result of explicit instruction in specific concepts, skills, and procedures (Driver et al. 1994; Resnick 1988; Schoenfeld 1992). Individuals learn by participating in the activities of a community along with more knowledgeable members, appropriating for themselves new understandings and ways of thinking. At the same time, these individuals influence the understandings and practices of the community. The image of teacher as presenter of information or stimulator of individual thinking is replaced by images of the teacher as coach, mentor, or master craftsperson working alongside an apprentice. The latter images underscore the fact that, in the world outside of school, thinking, knowing, and learning are often collaborative or, to put it another way, *distributed* across people and their environments.

The Distributed Nature of Cognition

Because intelligent activities are often collaborative rather than solo performances and because they often depend on resources beyond the individuals themselves (such as physical tools and notational systems), many researchers have focused on cognition as an activity that is distributed or "stretched over" the individual, other persons, and symbolic and physical environments (Lave 1988; Pea 1993).

The distributed nature of cognition has been illustrated by Hutchins (1990, 1991), who described the navigation of a U.S. Navy ship—a task so complex that no one individual involved in performing it had the knowledge and skills to complete it alone. Instead, six people with three different job descriptions were involved in piloting the ship out of the harbor. Two people on the deck took visual sightings. Two others relayed the readings to specialists on the bridge: one specialist recorded readings in a book while the other plotted the ship's position on a navigational chart and projected where it would be at the next sighting. The resultant information was used to decide what landmarks should be sighted next by the people on the deck. This distribution of cognition across people made it possible for the crew to accomplish cognitive tasks beyond the capabilities of any individual member.

It is important to note, however, that the team involved in navigating the ship did not possess all the knowledge essential to the navigational tasks at hand. Some of that knowledge was built into various sophisticated tools. As this example illustrates, cognition is sometimes distributed not only across persons but sometimes across persons and tools. Resnick (1987) focused on the changing distribution of knowledge between people and their tools by tracing the history of the compass. Before the invention of the compass, sailors navigated by the stars, locating constellations in the sky and performing complex geometric calculations to get their bearings. Simple magnetic compasses eliminated the need for some of these calculations, and as compasses became more sophisticated, additional computational work was eliminated. Today, essentially all needed computations are performed by gyrocompasses; most cognitive tasks involved in navigating have been shifted from sailors to their tools. As these examples from the domain of navigation illustrate, some tools do not merely enhance cognition, *they transform* it. Thus, as Pea (1993) has argued, the distribution of cognition across persons and tools should be seen as expansion rather than reallocation; by distributing cognition, we expand a system's capacity for innovation and invention.

Implications for Classrooms and Teachers

The research on the situated, social, and distributed nature of cognition has important implications for classrooms and teachers. Viewing cognition as situated implies that students should learn knowledge and skills in meaningful contexts. Two models for transforming classrooms into meaningful contexts or environments for learning are authentic instruction and cognitive apprenticeship. The implication of the notion of cognition as a social activity is that students must be prepared to participate in various communities. The implication of research on the distributed nature of cognition is that classroom environments should be more reflective of the distributed cognitive activities that occur outside the school environment and prepare students to work with the people, tools, and technologies encountered in the modern workplace. Guided learning classrooms represent an instructional model based on the principles underpinning the notion of distributed cognition. Each of these models is examined briefly.

Authentic Activities

Brown, Collins, and Duguid (1989) argue that classroom activities must be *authentic activities*, which they define as the "ordinary practices of a culture" (p. 34)—activities that are similar to what actual practitioners do in their work and out-of-school lives. According to Brown, Collins, and Duguid, authentic activities are to be differentiated from "school activities," which do not share contextual features with related out-of-school tasks and which often fail to support transfer to out-of-school settings.

Ann Brown and her colleagues (1993) offered a different definition of authentic classroom activities—one derived from the role of formal education in children's lives. If we consider the goal of education to be preparing students to be lifelong intentional learners, then activities are authentic if they serve that goal. In other words, activities are authentic if they foster the kinds of thinking and problem-solving skills that are important in out-of-school settings whether or not the activities themselves mirror what practitioners do. Increasingly, education and corporate leaders are arguing that these kinds of skills—the ability to think flexibly, learn new things, and work well with others in constantly changing environments—are essential for success in the modern workplace. Our discussion of authentic activities for student and teacher learning adopts a position similar to that of Ann Brown and colleagues; that is, we consider the kinds of thinking and problem-solving skills fostered by an activity to be the key criterion for authenticity.

Cognitive Apprenticeship

Cognitive apprenticeship (Collins, Brown, and Newman, 1989) is an instructional model that relies heavily on the notion of authentic classroom activities. According to the cognitive apprenticeship model, learning takes place in the context of complete, meaningful activities, that is, authentic activities. Students learn by participating in these activities and through social interaction focused on their participation. As in other forms of apprenticeship, teachers assume the role of "masters" who model "expert" performance and guide students' participation through coaching and scaffolding techniques.

A number of scholars have suggested that some, if not most, of teachers' knowledge is situated within the contexts of classrooms and teaching (Carter 1990; Carter and Doyle 1989; Leinhardt 1988). Carter and Doyle, for example, suggest that much of expert teachers' knowledge is "event structured" or "episodic." This professional knowledge is developed in context, stored together with characteristic features of the classrooms and activities within which it is developed, organized around the tasks that teachers accomplish in classroom settings, and accessed for use in similar situations. Thus, as teachers define problems specific to their classroom situations and create solutions for these problems, they store their newly developed knowledge together with key features of the classroom situations in which that knowledge was developed. Rather than being stored as a set of abstract rules or principles to be applied in any teaching situation, this knowledge is structured around classroom events and integrally connected to the classroom situations in which it is developed. It seems reasonable to assume that such situated knowledge coexists with context-free principles, theories, and research findings in teachers' systems of professional knowledge, and that teachers draw upon both types of knowledge when defining and solving problems of practice.

Discourse Communities

The various educational, work, and social communities in which students will eventually participate have been termed *multiple discourse communities*, and it has been argued that equipping them with the ability to think, reason, and act in these communities is a central goal of schooling (Lampert 1990; Michaels and O'Connor 1990; Resnick 1988). To accomplish this goal, schools and teachers must make decisions (consciously or unconsciously) about what kinds of discourse communities to establish. Some scholars have argued that classroom communities should be modeled after disciplinary communities of mathematicians, scientists, historians, and so on (Brown, Collins, and Duguid, 1989). In keeping with this view, several teachers and researchers have worked to develop classroom communities in which the discourse is modeled after the discourse assumed to be important in various disciplinary communities (e.g., Ball 1993 and Lampert 1990 in mathematics; Roth 1992 in science). Other scholars, including Brown et al. (1993), have argued that, rather than preparing students to participate in specific professional cultures, "schools should be communities where students learn to learn" (p. 190). The assumption underlying this argument is that, by participating in activities designed to question and extend their own knowledge in various domains, students will become enculturated into ways of learning that will continue for the rest of their lives. In each of these cases, the discourse communities being envisioned are significantly different from those traditionally found in public school classrooms.

We are only beginning to understand the role of the teacher in classrooms characterized by new kinds of discourse communities. Most educators working toward creating such classrooms agree, for example, that direct, didactic teaching has a place, but a less prominent one than in traditional classrooms. They also agree that the teacher should serve as a model and coach for the kinds of thinking and discourse students are expected to acquire. For example, if the classroom is to be a community where sense-making and mathematical argument are the norm, then the teacher must regularly model these habits of mind. As Lampert (1990) explains, "Given my goal of teaching students a new way of knowing mathematics, I needed to demonstrate what it would look like for someone more expert than they to know mathematics in the way I wanted them to know it" (p. 41). Similarly, if the emphasis is on active learning and inquiry (Brown et al. 1993), then the teacher must serve as a model of how to engage in inquiry-oriented learning. There is less consensus regarding when and for what purposes direct teaching is appropriate as well as about the nuances of skilled teaching through modeling, scaffolding, and coaching.

Whatever these changes in the teacher's role may look like, they will undoubtedly be accompanied by fairly deep changes in beliefs about knowledge, learning, and teaching. For example, teachers may come to view knowledge less as static bodies of facts, concepts, and procedures that exist apart from individuals and groups, and more as socially constructed ways of making sense of the world.

Scaffolding and Guided Learning

A number of scholars have argued that improving students' preparedness to function in the world outside the classroom requires paying more attention to issues of distributed cognition when designing classroom environments. For example, Pea (1993) wrote, "Socially scaffolded and externally mediated, artifact-supported cognition is so predominant in out-of-school settings that its disavowal in the classroom is detrimental to the transfer of learning beyond the classroom" (p. 75). He suggested that formal education should shift its emphasis away from individual, tool-free cognitive activities to facilitating students' "responsiveness and novel uses of resources for creative and intelligent activity alone and in collaboration" (p. 81).

The *guided learning classrooms* featured in design experiments for elementary school science conducted by Ann Brown and colleagues (Brown 1992; Brown et al. 1993) provide an example of how cognition and expertise can be intentionally distributed across students, as well as across students and tools, to create a community of learners where the major goal is preparing students as lifelong learners or "learning experts." Students in these classrooms engage in research cycles during which they explore such themes as animal defense mechanisms, changing populations, and food chains. A combination of the jigsaw method (Aronson 1978) and reciprocal teaching (Palincsar and Brown 1984) is used to distribute expertise across students. Each research theme is divided into five subtopics. The children are assigned to research groups where each child becomes an expert in one of the topics. The groups are then reconstituted as learning groups in which the "experts" use reciprocal teaching to lead discussions on their topics. Thus, each child in a learning group is an expert in one part of the material and is responsible for teaching it to others in the group. The computers that are part of the classroom environment also foster distributed cognition, for example, by giving students access to a wider community of learners and experts.

Several features of the culture of schooling seem antithetical to the idea of distributing components of a cognitive task across participants. As Resnick (1987) noted, "The dominant form of school learning and performance is individual. Although group activities of various kinds occur in school, students ultimately are judged on what they can do by themselves. Furthermore, a major part of the core activity of schooling is designed as individual work" (p. 13). Resnick (1987), Brown et al. (1993), and others offer persuasive arguments in favor of distributing cognition across students. In essence, they argue that to prepare students for successful participation in the workplace and other aspects of society, schools need to place more emphasis on socially shared cognitive activities, striking a balance between focusing on individual competence and on cooperation and collaboration.

Achieving such a balance requires reconsidering the typical practice of teaching all students (or, at least, all students of similar ability and achievement levels) the same body of knowledge and skills and then giving them the same test to determine what they have learned. One rationale for this practice is the belief in the existence of a core body of knowledge and skills that every child should learn in school. Several educational scholars offer an alternative perspective—that the goal of schooling should be to help students become good "adaptive learners" who can perform effectively in unfamiliar and unpredictable situations (Resnick 1987). Learning activities designed from this perspective emphasize a few powerful ideas that help students make sense of a wide variety of more specific ideas and learning-to-learn skills such as problem solving and participating in joint cognitive activity. Assessments entailing the use of tools such as projects, portfolios, and performance assessments focus on students' ability to discover and use knowledge and take into account the probability that each student will have learned a somewhat different set of facts and skills.

A number of concerns also arise when we consider distributing cognition across students and tools in classrooms. For example, although tools may provide greater accessibility to higher-level, more complex cognitive activities, they may do so at the expense of students acquiring basic skills and lower-level understandings (Pea 1993). Teachers of elementary and middle school mathematics encounter this issue when they consider students' use of calculators. On the one hand, calculators can make it possible for students to solve complex problems involving situations and data that have not been contrived to make calculations "come out even." On the other hand, many teachers (and parents) fear that, if students use calculators, they will not learn the basic computational skills considered an essential underpinning for mathematical understanding and the learning of more advanced mathematics. An important question typically lost in the debate over whether and how students should use calculators is which computational skills are truly "basic" for mathematical understanding and which are obsolete leftovers from preelectronic culture. Pea rightly cautions us to be aware of these questions and trade-offs and take them into account when deciding which tools students will be permitted to use.

The teacher's role in a classroom designed to foster and take advantage of distributed cognition differs from that in a classroom emphasizing independent, individual learning. For example, when classroom tasks are designed to incorporate a view of distributed cognition, the teacher cannot be expected to claim expertise in all the information domains explored. Gone is the image of the teacher as one who imparts knowledge. In its place is the image of the teacher as a guide for students' inquiry into multiple domains. When assuming the role of a guide, a teacher teaches as students become ready to learn rather than as prescribed by a set curriculum or rigid lesson plan. The shift away from a conception of the teacher as all-knowing being also creates opportunities for teachers to model the kinds of inquiry desired for students—to become "the master craftsperson of learning whom [students] must emulate" (Brown et al. 1993, p. 207).

This role shift may be a difficult one for teachers to make. As Brown et al. suggest, "guiding learning is easier to talk about than to do. It takes clinical judgment to know when to intervene" (p. 207) and how to achieve a balance between fostering discovery and furnishing guidance. Further, to model inquiry, the teacher must be able to recognize when she does not know an answer, be comfortable acknowledging what she does not know, and have the cognitive and physical resources to remedy this lack of knowledge.

Computers and other new technologies have great potential for supporting these changes in teachers' roles; for example, tools such as computers can facilitate teacher inquiry by providing access to vast amounts of information. Teachers' access to distributed expertise has traditionally been limited primarily to printed materials and face-to-face interactions (e.g., through inservice activities and conferences). Electronic mail, user groups, and other online forums offer teachers the potential of communicating and sharing with a much wider range of colleagues and experts in various fields, thus supporting the formation of new kinds of discourse and learning communities. Information systems such as the World Wide Web provide access to digital libraries and vast amounts of information in print, visual, and video form. Just as technology can provide students with access to people and information far beyond their classroom walls, so too can it expand teachers' access to the expertise of a wide range of people and communities. In this manner, the World Wide Web has the potential to support and transform the tasks of teaching (Marx, Blumenfeld, Krajcik, and Soloway 1998).

In addition to information access, technology has the potential to transform teachers' work through the use of productivity tools such as word processors, spreadsheets, and database management systems. Although such tools have fundamentally changed many of the tasks of the business world, they have not yet had a significant impact on the work of most teachers (Marx et al. 1998). Although many teachers have turned to computers for relatively mundane tasks such as keeping attendance and grades, they have yet to avail themselves of the more fundamental support that tools such as computers can provide. One such tool is the Project Integration Visualization Tool (PIViT) (Marx et al. 1998), which is designed to aid teacher planning. By using the PIViT, teachers can create, elaborate, and revise "project designs"—graphical representations of projects that include central questions, curricular objectives, concepts, student investigations, teacher activities, and artifacts. The PIViT was developed both to be consistent with what is known about how teachers actually plan and to facilitate (scaffold) teachers' thinking about curriculum and instruction in new ways. In other words, the PIViT's developers were trying to capitalize on the idea that cognitive tools not only make tasks more efficient but can actually transform the nature of thinking and work. Their research indicates that teachers who used PIViT to design and adapt curriculum for their classrooms were able to create multiple representations of their project designs that would not have been possible had they used linear planning.

Implications for Teacher Education

It is especially important that the principles emerging from research on the situated, social, and distributed aspects of cognition be incorporated into the design of preservice teacher education programs inasmuch as preservice teachers will eventually be expected to incorporate those same principles into their own teaching.

The social perspective on cognition and the closely allied notion that thinking, knowing, and learning are spread or distributed across people and their environments draw attention to the discourse communities in which teachers work and learn. They also underlie the question of how preservice teachers' learning can be enhanced by designing preservice teacher education programs that incorporate principles such as authentic activities, cognitive apprenticeship, guided instruction, communities of discourse and learning, and situative instruction into their own teaching practice.

At first glance, the assumption that cognition is situated in particular contexts suggests that learning experiences for prospective teachers should, as much as possible, be situated in classroom practice. Preservice teachers do not, however, have their own classrooms in which to situate learning activities, and they have limited teaching experiences from which to draw in discussions of pedagogical issues. This reality raises several questions: Are the kinds of opportunities and support that teacher education programs can provide within existing classroom settings ideal, or even sufficient, for helping novice teachers to explore new ways of teaching? What contexts other than K-12 classrooms might serve as valuable sites for preservice teachers' learning? In what other contexts within university courses can authentic learning activities be situated?

We address these issues through a consideration of various types of activities and experiences designed by teacher educators to foster prospective teachers' learning. We examine both course work and student teaching components of preservice teacher education programs. We begin by returning to Brown et al.'s (1993) definition of authentic activities as activities that foster students' thinking, problem solving, and learning to learn. In some ways, the challenge to create authentic activities in teacher preparation courses is parallel to the challenge in K-12 classrooms. Teacher educators must create experiences that enable prospective teachers to wrestle with important problems of pedagogy by using problem-solving skills and conceptual tools of teachers. One instructional model that has been proposed as a way of promoting an environment conducive to problem solving and authentic or reflective learning is the cohort-based teaching model.

Cohort-Based Teaching and Discourse Communities

The cohort-based teacher education model is based on the principle of building cohorts of students who move together through courses and experiences (Howey 1996). Cohort-based teaching reflects two important principles that follow from the thinking regarding the social and distributed nature of cognition: enculturation into communities of discourse and the distribution of professional expertise.

Cohort-based teacher education programs and similar arrangements that give preservice teachers opportunities to participate in various discourse communities are also valuable from the standpoint of enhancing preservice teachers' understanding of the conception of distributed professional expertise. Such experiences, particularly when combined with the idea of coordinated and integrated learning experiences, highlight the importance of a different kind of competence for thoughtful teaching—the ability to draw upon the knowledge and expertise of others and to contribute one's own knowledge in productive ways to the group. In contrast, many teacher educators traditionally have assumed that the successful new teacher should be "self-contained" and "self-sufficient," independently possessing the skills and knowledge for expert teaching. Viewing cognition as distributed across persons does not negate the importance of prospective teachers acquiring individual knowledge and skill, but it shifts the focus to the overall "system" within which the individual teacher will work. To make this shift, teacher educators need to better understand how new teachers can learn to work as part of a larger community of teachers. According to Zimpher (1998), cohort arrangements would not only enable cohort members to experience intellectual development collectively and enable cohort members to engage in a form of group socialization but would also strengthen the group's interaction with faculty and provide valuable feedback to professors about the effects of their curriculum design.

Focusing on the system within which teachers work also has implications for our thinking about desired outcomes of teacher education. Although some knowledge and skills are essential for all teachers, others can be developed by individual teachers to varying degrees, depending on their goals and proclivities. This line of reasoning is parallel to one that Brown et al. considered as they designed their guided learning classrooms. In these classrooms, individual students develop expertise in different areas—departing from a view of curriculum that assumes all students should learn the same things. As we pointed out, however, Brown argued that some aspects of the curriculum are important for all students to learn, in particular, the knowledge, skills, and dispositions needed for being an active and continuing learner. Similarly, teacher educators need to consider carefully what are the analogous "essential" knowledge and skills for new teachers. We then need to design our assessment systems to be compatible with these considerations.

Traditionally, preservice teacher education programs have focused more on the development of individual competencies thought to be important for teaching than on the establishment of discourse communities for prospective teachers. However, the view of knowledge as socially constructed makes it clear that an important part of learning to teach is becoming enculturated into the teaching community—learning to think, talk, and act as a teacher. This claim is supported by research on the socialization of teachers into cultures of schools and teaching (for a review, see Zeichner and Gore 1990).

> **"An important part of learning to teach is becoming enculturated into the teaching community—learning to think, talk, and act as a teacher."**

As we suggested in our discussion of student teaching, however, enculturation into professional teaching communities can be problematic when existing communities embody norms and expectations that do not support the experimentation, risk taking, and reflection required to transform practice (McLaughlin and Talbert 1993). Patterns of classroom teaching and learning have historically been resistant to fundamental change, in part because schools have served as powerful discourse communities that enculturate participants—students, teachers, administrators—into traditional school activities and ways of thinking (Cohen 1989; Sarason 1990) rather than fostering critical and reflective examination of teacher practice.

A conception of knowledge, expertise, and thinking as distributed across persons shifts the focus of discussions about teachers' work lives from considering teachers as "self-contained" individuals to looking at the overall "system" or community in which teachers work and interact. From this perspective, the competent teacher is not a person who can "do everything" and "know everything" in isolation but rather an individual who can work well within a broader system of expertise. A version of this kind of thinking is already represented in the departmentalized structure of most secondary schools. Too often, however, departmental structures lead to an overly rigid compartmentalization of learning experiences for students and for teachers. A distributed perspective focuses attention on the potential for integration and coordination of various components of learning experiences and expertise, rather than on isolation and compartmentalization.

An issue for preservice teacher education, then, is how to establish discourse communities in which prospective teachers can be thoughtful and reflective in constructing their practice. Much remains to be learned about how to establish cohorts in teacher education programs in ways that will facilitate norms of inquiry and reflection among prospective teachers. Among the issues that must be addressed are the roles of teacher educators and mentor teachers in guiding the establishment and enactment of these norms.

School-Based Teacher Education Programs

For the coursework that typically precedes student teaching, the most obvious use of the situated perspective is placing much of the learning and activity of prospective teachers in K-12 classrooms. Grimmett and MacKinnon (1992) described one alternative to traditional teacher education courses that fits this model. Based on their commitment to the value of teachers' craft knowledge, Grimmett and MacKinnon questioned the common practice of offering methods classes on campus and in the absence of children. As an alternative, they suggested that teacher educators bring professors, experienced teachers, and preservice teachers together in the joint teaching of children in school settings. Citing the example of a school-based teacher education program in which preservice teachers taught alongside their professors and analyzed videotapes of their teaching (MacKinnon and Grunau 1991), Grimmett and MacKinnon reported that "all of the participants—beginning and experienced teachers, as well as professors—learned a great deal about teaching at one another's elbows" (p. 436). The close collaboration between experienced and novice teachers described by Grimmett and MacKinnon is also a feature of another important form of school-based learning—the Professional Development School.

Professional Development Schools

Professional Development Schools (Holmes Group 1990), which are springing up in many places across the country, also attempt to situate much of preservice teachers' learning to teach in K-12 classrooms. Although Professional Development Schools (PDS) typically have multiple purposes, including research on innovative teaching practices and the professional development of experienced teachers and university faculty, providing a school context for the learning of prospective teachers is an important part of their mission.

PDS represent another context that may provide reflective, critical discourse communities for preservice teachers. The establishment of new learning communities where inquiry, critique, and reflection are the norms is a central component of most PDS. To what extent do these communities enable inservice teachers, preservice teachers, university faculty, and graduate students to study and learn together, while working toward the overall improvement of teaching and learning?

Within contexts such as Professional Development Schools that exemplify desirable teaching practice and reflective teaching, an important issue for the learning of prospective teachers is the form of guidance and support offered them by more knowledgeable others—the teacher educators and experienced teachers with whom they work. Although the view of the cooperating teaching as a mentor or coach to the student teacher or teacher intern is a common one, little systematic inquiry has been conducted on the nature of this mentoring role. Feiman-Nemser and Beasley (1997) explore this role through a case study of a cooperating teacher (Beasley) working with a teacher intern to plan together a lesson for the second/third-grade class they teach. Feiman-Nemser and Beasley's analysis portrays the complex interplay between the learning about the content to be taught by both the cooperating teacher and the intern and the scaffolding and guidance offered by Beasley:

> Working alongside her mentor, Elaine has an opportunity to learn about planning and teaching from the inside. As she observes and participates in the design process, Elaine forms ideas about what planning entails while contributing what she can to the developing curriculum. As she attends to Kathy's demonstrations and advice, Elaine learns what to say and do in the lesson, while acquiring contextualized knowledge of students and pedagogy. (pp. 123-124)

The type of reflection in which Elaine is engaging—considering the best way to teach a lesson—is the most basic of three levels of reflective pedagogical thinking that are, according to Sparks-Langer et al. (1990), generally accepted as the types of thinking in which experienced teachers regularly engage. The three levels are as follows: *technical reflection* (reflection aimed at identifying the best way to reach an unexamined goal); *practical reflection* (reflection on the worth of a lesson's goals and the means used to reach them); and *critical reflection* (reflection during which "moral and ethical issues of social compassion and justice are considered along with the means and ends" [p. 24]). Sparks-Langer et al. offer a seven-level Framework for Reflective Thinking that may be used to assess preservice teachers' development of reflective pedagogical thinking based on the language they use to describe instructional events from a day of teaching. As preservice teachers' critical pedagogical reflection becomes more like that of an experienced teacher, their descriptions progress through the following levels of sophistication: descriptions with no descriptive language; simple, layperson descriptions; events labeled with appropriate terms; explanations based on traditional or personal preferences; explanations based on principles or theories; explanations based on principles and/or theories as well as consideration of context factors; and explanations developed with consideration for ethical, moral, and political issues (p. 27).

Case-Based Teaching

Despite their demonstrated effectiveness, school-based programs that rely heavily on actual classroom settings are not always feasible. In recognition of this fact, a number of educational scholars have suggested cases as an alternative way of creating authentic learning experiences for preservice teachers (Carter 1990; Doyle 1990; Leinhardt 1990; Sykes and Bird 1992). Cases constructed for use in teacher education share a common focus on specific situations, as well as the provision of vicarious rather than direct encounters with those situations. Cases can support the consideration of general principles and factors as they interact in complex ways in practice. Although not authentic in the sense of being actual classroom experiences, cases do allow preservice teachers to explore real pedagogical problems. In fact, some proponents suggest that cases have several advantages over field experiences. Cases provide a shared experience for preservice teachers to examine as a group, and they afford the teacher educator more control over the situations that preservice teachers encounter and the issues that they explore within those situations (Feltovich, Spiro, and Coulson 1997; Spiro, Coulson, Feltovich, and Anderson 1988). Cases also enable teacher educators to prepare for discussions and other activities in which the materials are used (Sykes and Bird 1992).

Cases can exist in many different forms and serve a variety of purposes in teacher education. Some pedagogical approaches use cases of exemplary teaching to help preservice teachers understand particular pedagogical concepts and make connections between theories of instruction and the enactment of those theories under real conditions (Leinhardt 1988). This use is particularly appropriate for preparing teachers to teach in new ways, inasmuch as teachers' opportunities to experience exemplary alternatives to conventional practice in actual classroom settings are likely to be quite limited.

Other approaches draw on cases of problematic classroom events as sites for developing teachers' analytic and problem-solving skills (Ball, Lampert, and Rosenberg 1991; Doyle 1990; Merseth 1990). In their analyses of cases of problematic teaching situations, prospective teachers can practice framing problems, generating various solutions to those problems, choosing among alternative solutions, and reflecting on implications of their choices. As Rand Spiro and his colleagues (Feltovich et al. 1997; Spiro et al. 1988) have argued, dealing with multiple principles and perspectives interacting in complex cases is an essential experience in developing the cognitive flexibility that characterizes complex skills such as teaching.

Another dimension along which cases vary is the richness or complexity of classroom life they portray. All cases limit the information they provide. Some media, such as videotape, can convey more of the complexity of classroom events than written cases. Interactive multimedia cases and hypermedia environments have the potential to provide even richer sets of materials depicting classroom teaching and learning. Examples are the materials developed by Lampert and Ball as part of their Mathematics and Teaching through Hypermedia (MATH) Project (Ball et al. 1991; Lampert and Eshelman 1995; Lampert, Heaton, and Ball 1994) and by Goldman and colleagues in the Cognition and Technology Group at Vanderbilt (1990). Lampert and Ball's hypermedia Student Learning Environment (SLE) contains a variety of materials documenting teaching and learning of mathematics in the third- and fifth-grade classes where they taught on a regular basis. These materials include videotapes of classroom mathematics lessons, instructional materials, teacher journals, student notebooks, students' work, and teacher and student interviews, as well as tools for browsing, annotating, and constructing arguments.

Because of their nonlinearity, because they allow users to visit and revisit various sources of information quickly and easily, and because they make it possible to build and store flexible and multiple links among various pieces of information, hypermedia systems such as the one just described allow users to consider multiple perspectives on an event simultaneously (Feltovich et al. 1997; Spiro et al. 1988). Further, the extensiveness of the databases and the ease of searching them enable teachers to define and explore problems of their own choosing (Merseth and Lacey 1993). Like written and videotaped cases, these multimedia and hypermedia materials provide a shared context for exploration of pedagogical problems. In contrast to written and videotaped cases, multimedia and hypermedia materials can be crafted to mirror the complexity of the problem space in which teachers work.

Authentic Activities, Subject Matter Knowledge, and Tools of the Trade

Cases are typically used to help prospective teachers develop pedagogical knowledge, pedagogical content knowledge, and the ability to think through complex pedagogical problems. A number of studies indicate that prospective teachers (as well as experienced teachers) often lack the rich and flexible subject matter knowledge required to be responsive to students' thinking and foster learning with understanding (Borko and Putnam 1996; McDiarmid, Ball, and Anderson 1989). Thus, teacher educators must also provide experiences through which preservice teachers can enhance their subject matter knowledge in ways that will support their teaching.

One approach is to situate prospective teachers' learning of subject matter in activities that are *authentic*, a term that Newmann and Wehlage (1993) use to distinguish between achievement that is significant and meaningful and that which is trivial and useless. Newmann and Wehlage offer five standards as a foundation for evaluating activities' authenticity:

1. **Higher-order thinking.** Students "manipulate information and ideas in ways that transform their meaning and implications." (p. 9)
2. **Depth of knowledge.** Students "make clear distinctions, develop arguments, solve, problems, construct explanations, and otherwise work in relatively complex understandings." (p. 9)
3. **Connectedness to the world.** Students "work on a problem or issue that the teacher and students see as connected to their personal experiences or contemporary public situations" and "explore these connections in ways that create personal meaning." (p. 10)
4. **Substantive conversation.** Students engage in substantive conversation, as indicated by three features: "considerable interaction about the ideas of a topic"; "sharing of ideas in exchanges that are not scripted or controlled"; and "dialogue that builds coherently on participants' ideas to promote improved collective understanding of a theme or topic." (p. 10)
5. **Social support for student achievement.** Teachers convey "high expectations for all students, including that it is necessary to take risks and try hard to master challenging academic work, that all members of the class can learn important knowledge and skills, and that a climate of mutual respect among all members of the class contributes to achievement by all." (p 11)

Research has documented the benefits of organizing course activities that are authentic from the perspective of the subject matter discipline. For example, several studies (Schram, Wilcox, Lappan, and Lanier 1989; Simon 1995; Wilcox, Schram, Lappan, and Lanier 1990) have suggested that, by organizing courses about mathematics and mathematics teaching around solving nonroutine mathematical problems and providing opportunities to talk about mathematics, university professors can help prospective mathematics teachers improve not just their knowledge of mathematics content but also their understanding of what it means to know mathematics and how mathematics is learned. Similarly, prospective teachers who took courses in the teaching of history that were organized around the examination of what and how historians think about critical topics demonstrated not just enhanced understanding of history but also insight into how they could eventually develop such understanding in their own students (McDiarmid 1995). As these examples indicate, activities that engage preservice teachers in solving complex, discipline-based problems and sharing their solutions with peers may be an effective way to situate learning of subject matter for teaching.

Preservice teachers also need activities that are authentic from the standpoint of reflecting the fact that cognition is frequently distributed across persons and across persons and tools. It is particulary important that preservice teachers be given opportunities to learn to use the "tools of their trade." Textbooks have long played a central role in the lives of teachers and students in schools, representing much of the content of instruction and providing much of the structure for the curriculum. Despite this fact, many preservice programs prepare teachers in ways that seem to ignore these instructional tools (Ball and Feiman-Nemser 1988). Perhaps because they associate textbooks with "traditional" forms of instruction they find problematic, teacher educators often emphasize the need for new teachers to develop innovative instructional units and materials "on their own." As a result, new teachers frequently do not receive experience and guidance in planning instruction around existing textbooks, making judgments about the instruction textbooks represent, and modifying that instruction.

Teacher education programs should also provide opportunities for prospective teachers to learn about new technologies and explore how to incorporate those technologies into classroom activities. For example, designers of courses for preservice teachers can take advantage of most universities' telecommunication capabilities to introduce teachers to electronic mail and information resources available through the Internet. Computers and telecommunication tools can be incorporated into course assignments such as ongoing e-mail conversations about course readings and evaluations of computer software relevant to the course subject matter.

Computer technologies can also support teachers' learning in ways that build on assumptions about the social, situated, and distributed nature of thinking and learning. As has already been mentioned, multimedia systems, with their new and flexible ways of representing and connecting information, can enable teachers to explore unfamiliar pedagogical practices and various problems of pedagogy. Lampert and Ball's Student Learning Environment (Lampert et al. 1994), described earlier, provides one image of the possible (Shulman 1983). Within this environment teachers are able to investigate pedagogical problems that arise as they view and read about Ball's teaching of mathematics in a third-grade classroom and Lampert's in a fifth-grade classroom, simultaneously becoming familiar with new technological tools and exploring new ideas about teaching and learning.

Krajcik, Blumenfeld, Marx and colleagues have also created technology-based tools that can support teacher learning (Krajcik, Blumenfeld, and Starr 1993; Marx et al. 1998; Urdan, Blumenfeld, Soloway, and Brade 1992). The CaPPs (Casebook of Project Practices) is a collection of multimedia cases, each of which tells a story about how a particular teacher resolved a challenge associated with enacting project-based science. The SLE and the CaPPs are similar in that both can be used by teachers to explore new visions of teaching and learning. They differ from one another in the sense that the CaPPs presents teachers with an organized set of selected video clips depicting particular teaching issues, whereas the SLE presents teachers with a large corpus of information that they can use to develop and explore their own questions. In contrast to Ball and Lampert's SLE, which has been used with preservice teachers, Marx and colleagues' CaPPs has been used only with experienced teachers in professional development situations. Our hunch is that it would be a valuable tool for preservice teacher education as well.

In their own work with preservice teachers, Krajcik and colleagues have used a productivity tool similar to PIViT. Instruction by Design (IByD) (Urdan, Blumenfeld, Soloway, and Brade 1992) is a computer-aided design system, developed for use in teacher preparation programs, that scaffolds the design of units and lessons. IByD enables students to build and store individual knowledge bases and to apply what they learn elsewhere in their program (e.g., courses, readings) to the design of instructional plans.

As teachers work with technological tools such as SLE, CaPPs, and IByD for their own learning and to support their teaching, they are simultaneously becoming familiar with technologies that can be used in their classrooms in support of student learning. Although these particular tools are designed for teacher learning, the technologies on which they are based (e.g., hypermedia cases, computer-aided design systems) have their counterparts for K-12 students. It is not enough for teachers to learn to use these new cognitive tools. They must also reflect on their experiences with technology and ask themselves how these experiences might inform activities and instructional programs they design for their own classrooms.

Combining University and School Settings

The activities discussed thus far have been situated in either university or K-12 settings. A number of preservice teacher education programs are attempting to coordinate experiences in the two types of settings, for example, by combining "practica" or "field experiences" with foundations and methods courses. Wolf required preservice teachers enrolled in her children's literature course to conduct a "reader response case study" with a young child (Wolf, Carey, and Mieras 1996; Wolf, Mieras, and Carey 1995). The preservice teachers each read with a child on a weekly basis, after which they used their detailed field notes of the reading sessions and Wolf's commentary as the foundation for a final paper on the child's response to literature and their own growth as teachers of children's literature. The preservice teachers' conceptions of literary response shifted toward an increased emphasis on interpretation over comprehension. In addition, they came to hold higher expectations for children's capacity to interpret text, and they developed a richer understanding of their roles as teachers of literature. Wolf and colleagues concluded that situating the preservice teachers' learning simultaneously in university experiences that included reading assignments, lectures, and discussions and field-based experienced centered around reader response case studies was crucial to the course's success. As they explained,

> Much of the necessary work to guide and support preservice teachers' growing understandings of literary response can be accomplished in university class settings that emphasize subject matter knowledge. . . . Still, subject matter knowledge is only a part of the necessary training for preservice teachers. To arrive at a more complete understanding of children's literary response, preservice teachers must be involved with children—moving from the more distanced study of children in articles and books to the here and now of working with real children. . . . Thus, a university course infusion of new research ideas with multiple, though sometimes hypothetical, examples must be balanced with authentic, literary interaction which children, if we expect to see preservice teachers shift from limited comprehension-based expectations to broader interpretive possibilities for literary discussion. (Wolf, Carey, and Mieras, 1996, p. 134)

Another possibility for combining university- and field-based experiences is to offer university-based seminars concurrently with student teaching experiences. In these seminars, student teachers can critically analyze their learning-to-teach experience and examine relationships between their ideas and practices. The University of Colorado-Boulder recently added a course designed for this purpose to its preservice teacher education program. Each section of the course consists of the instructor (who also serves as the university supervisor of student teaching) and the six or seven student teachers she is supervising. Central goals, as stated on the syllabus, are as follows: support student teachers as they explore their roles and professional identities as novice teachers; promote professional and collegial communication among student teachers and between student teachers and university teacher educators; discuss educational issues of mutual interest and share relevant professional literature; and promote inquiry into and reflection on the teaching process. The major assignments are a journal and a teaching portfolio. This course, like several other program components already described, situates preservice teachers' learning simultaneously in university and K-12 settings. Indeed, our analyses suggests that a combination of several types of experiences situated in a variety of contexts may be a powerful design for both the course work and student teaching components of preservice teacher education.

The Student Teaching Experience

Traditionally, the most common way to situate prospective teachers' learning is through student teaching placements in K-12 public school classrooms. Student teaching has long been considered the capstone experience of teacher education programs. During student teaching, novices have the opportunity to practice enacting their pedagogical knowledge and beliefs in actual classroom settings, explore new instructional strategies, and receive feedback on the lessons they teach. Research does not, however, offer clear evidence that student teaching has a substantial influence on prospective teachers' ideas and practices (Glickman and Bey 1990; Zeichner 1985). Even if it did, concerns about the ability of the experience to foster and support new ways of teaching would remain. Central among these concerns is whether classrooms available for student teachers embody the kinds of teaching advocated by university teacher education programs. As Sykes and Bird (1992) caution:

> Finally, the situated cognition perspective draws on the image of apprenticeship in a guild or a professional community as a powerful form of learning. But this image requires a stable, satisfactory practice that the novice can join. If the aim of teacher education is a reformed practice that is not readily available, and if there is no reinforcing

> culture to support such practice, then the basic imagery of apprenticeship seems to break down. Teachers' knowledge is situated, but this truism creates a puzzle for reform. Through what activities and situations do teachers learn new practices that may not be routinely reinforced in the work setting? (p. 501)

For student teaching to do more than reproduce traditional teaching routines, teacher educators must ensure that the experience extends and transcends practices that student teachers encounter in particular schools (McNamara 1995). Thus, an important problem facing teacher educators is how to design experiences that maintain the situatedness of student teaching, while avoiding the "pull" of traditional school culture. One possibility would be to place preservice teachers in classrooms of teachers who, regardless of how they teach, are willing to let student teachers try out their new visions of learning and teaching. University supervisors could then draw upon their conceptual understanding of innovative teaching to provide coaching, feedback, and support.

Conclusion

Throughout our discussion of the role of context in teachers' learning, we have emphasized the notions of situated, social, and distributed cognition because they capture and highlight important ideas about knowing and learning currently being discussed in the research community. It is important to remember that these notions and accompanying constructs are highly interrelated in both theory and practice. Any discussion about how teachers' learning is or might be situated in new contexts entails consideration of the social aspects of knowing and learning as well as the ways in which knowing and learning are distributed across persons and tools in various contexts. Indeed, the *situative* perspective, as characterized by Greeno and colleagues (Greeno 1997; Greeno et al. 1996, 1998) explicitly incorporates a blending of the situated, the social, and the distributed:

> Success in cognitive activities such as reasoning, remembering, and perceiving is understood in terms of achievement of a system consisting of individual participants and tools and artifacts. This means that thinking is situated in a particular context of intentions, social partners, and tools. (Greeno et al. 1996, p. 20)

"Any discussion about how teachers' learning is or might be situated in new contexts entails consideration of the social aspects of knowing and learning as well as the ways in which knowing and learning are distributed across persons and tools in various contexts."

As Greeno and colleagues (1998) argue, this situative perspective holds considerable promise for synthesizing the historically separate perspectives of behavioral and cognitive psychology, as well as bringing together the study of individual cognition and of socially organized interaction. The scholarly community and subcommunities trying to advance understanding of the nature of human thinking and learning in complex contexts will continue to discuss and refine our understanding of these processes. These discussions will in turn continue to be an important source of conceptual tools for educators working to understand, improve, and better contextualize the learning of students and teachers.

The situative perspective is currently in a state of newness and flux, with various proponents disagreeing about the definitions and relationships of some constructs and issues. Even in this state, however, the situative perspective can direct our attention in valuable ways as we think about educating teachers. Here we revisit what we see as key implications of recent discourse about the situative perspective for the learning of preservice teachers. We formulate these implications as a set of recommendations for key features of teacher education programs. Just as the situative perspective blends the situated, the social, and the distributed, each of our recommendations cuts across these three themes.

1. **Situating learning in multiple settings**. First, it seems important to think about how best to situate preservice teachers' learning in multiple settings for different purposes, rather than about finding the one ideal setting for teacher education. As we discussed earlier, situating a teacher's learning in authentic contexts does not imply that meaningful learning for teaching can take place only in K-12 classroom settings. Critical to selecting appropriate contexts for teacher education experiences is the careful consideration of the *affordances* and *constraints* (Gibson 1979/1986; Norman 1988) each context offers to support teachers' learning. As Greeno et al. (1998) argued,

    > Viewed in the situative perspective, all arrangements of activity provide situations and practices in which learning occurs, and all learning occurs in some situation. The difference between learning in different arrangements is not whether learning is situated or not, but how it is situated. (p. 14)

    Recent scholarship from the situative perspective offers teacher educators new conceptual tools with which to analyze and design better contexts for learning.

2. **Discourse and learning communities.** The importance of discourse communities in which individuals come together for various activities pervades virtually every discussion of learning from the situative perspective. In fact, it is not unreasonable, within this perspective, to view learning to teach as enculturation into communities of practice. Such communities and the cultures that accompany them are an integral part of the professional context within which new teachers must work and develop.

   One critical question implied by the situative perspective is whether a teacher education program can find or establish a sufficient number of appropriate teaching communities into which new teachers can be socialized. It seems likely that this need for appropriate communities of practice can be successfully met only by some thoughtful combination of developing and nurturing professional communities in the schools within which novice teachers can learn, and establishing communities among prospective teachers that have an identity and continuity not characteristic of typical course-based teacher education programs. In both cases, establishing norms of thoughtfulness and critical reflection are key. To quote Greeno et al. (1998) again, "if we value students' learning to participate in practices of inquiry and sense-making, we need to arrange learning practices of inquiry and sense-making for them to participate in" (p. 14). Similarly, if we want to promote reflection and inquiry in new teachers, we must develop contexts and communities within which they can participate in reflection and inquiry about teaching and learning.

3. **Attention to the tools of teaching.** Finally, the situative perspective highlights the importance of attending to the tools with which teachers work. Teacher education programs traditionally have placed too much emphasis on abstract principles and ideas about teaching and learning, and not enough on using the tools that are an integral part of a teacher's work. As teacher educators we need to provide more opportunities for prospective teachers to engage in reflection and inquiry using the textbooks and other materials with which they will be teaching. And we need to support new teachers in learning to work with and use the rapidly expanding array of new technological tools that can support their teaching and professional discourse when they enter the schools.

To close, we offer two examples of current teacher education efforts that incorporate several of these ideas and illustrate how they might come together in the practice of teacher education. The first effort consists of three pilot teacher education programs that were developed on the basis of a framework for teacher reflection integrating cognitive, critical, and personal characteristics (Colton and Sparks-Langer 1993). According to the framework, when reflective teachers are confronted with a situation requiring action (planning, implementing, and evaluating), they draw upon a professional knowledge base consisting of seven types of professional knowledge (content, students, pedagogy, context, prior experience, personal views and values, and "automatic metacognitive scripts to guide their analyses and interpretations of situations" [p. 49]) to make the decisions required to act. As they observe and analyze the consequences of their actions, they construct new knowledge and meaning and add to their professional knowledge base. According to the framework, these cycles of analyzing, acting, and constructing new knowledge and meaning occur in a collegial environment and are driven by four attributes of reflective teachers: efficacy, flexibility, social responsibility, and consciousness.

The teacher induction and student teacher programs that were developed on the basis of the framework involve the following activities: training in the characteristics of reflective professional decision makers; cognitive apprenticeship; development of interpersonal skills; collaborative problem solving; coaching (including "cognitive coaching" [p. 52]) and supervision; and developmentally structured student teaching activities designed to promote the skills and attitudes of reflective professional decision makers. All these activities reflect consideration of the situated, social, and distributed aspects of cognition.

As our second example, we offer the Mathematics and Teaching through Hypermedia (MATH) materials that were developed by Lampert and Ball (in press) to help prepare preservice and inservice teachers to teach in ways promoted by contemporary K-12 reform visions. As Lampert and Ball indicate, for teachers to teach in these ways, they must know *in* and *about* teaching. In other words, in addition to knowing theories, ideas, and strategies that can be learned in advance. teachers must also "know in the context of practice." At any given point in time, for example, a teacher must know what particular students understand, what a student's comment or silence means, whether something she is doing is working, when to move on, and when to spend more time on an idea. Lampert and Ball explored the use of *investigations* of the practices of teaching and learning conducted with the MATH materials to help preservice and inservice teachers learn to know *in* teaching. They designed learning experiences in which teachers use these materials to investigate a variety of questions about particular phenomena of practice. For example, a typical set of experiences might include having an entire teacher education class watch a video segment from Ball's teaching of third-grade mathematics, soliciting questions and comments from the class, providing a list of other materials available for investigations, brainstorming possible questions to investigate using these materials, and having groups of students set off to pursue their questions independently. Such experiences situate preservice teachers' learning in concrete phenomena of practice, providing them with the opportunity to learn about the relationship between knowing and doing in practice. Further, when investigations are conducted in groups (as Lampert and Ball recommend), they provide the opportunity for exploring the multiple perspectives and multiple interpretations that are possible for a single event or issue, and often result in social construction of richer understandings than an individual would achieve alone.

Lampert and Ball's approach to teacher education thus combines many of the key ideas we have explored in this paper: situating learning in authentic and meaningful contexts, learning through social interaction in a discourse community focused on genuine problems of practice, and embedding learning in the context of new tools that can support thinking and action. The knowledge that preservice and inservice teachers gain from experiences in this setting is not the inert knowledge about which Whitehead (1929) complained; rather, it is knowing that is contextualized in practice, an important goal for the learning of teachers and students.

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Problem-Based Learning: Learning and Teaching in the Context of Problems

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> You are a first grade teacher who has been assigned the 23 students portrayed in a video. Your task is to identify one of the students who seems to have special learning needs and/or talents and to define those needs and talents. Shortly, you will be teaching a unit about how plants grow. The student you have identified will be in a group with four other students (identified by other "first-grade teachers"). Your task will be to determine how you will help that group of five students as your student works with others to learn about plants.

This problem was posed recently to an educational psychology class of 30 undergraduates majoring in elementary education and special education. They were shown a 40-minute video edited from a 3-hour tape filmed during a visit to a first-grade class. Each of the university students identified a child who intrigued them and viewed the tape again. This time, their task was twofold: to begin the job of defining their student's strengths and needs and to formulate questions designed to collect more information that would assist in accurate diagnoses and recommendations.

Individually, the college students formulated their own hypotheses and questions and then met with classmates. The class arranged themselves into groups to pool their observations and develop a plan of action to gather additional information that would answer their questions. As part of their plan, they were expected to create questions for the first-grade teacher. These questions could request more information regarding school work, social relations, home life, etc. The undergraduates were not to ask the teacher to reveal her diagnosis of the child, and the teacher was cautioned not to give answers that contained more information than had been requested. Some of their questions were, "Is he on any medication for attention deficit disorder?" "What is his reading level?" "Does he have a problem retaining information for short periods of time?" and "How well does he interact with other children in social settings?"

The students' questions were submitted to the classroom teacher. At the next meeting, the students worked individually and then in groups to refine their definitions of the children's needs and strengths. The professor made available various references and indicated that the teacher had provided some additional background information if the students specifically requested it. The undergraduates were guided to consider the evidence they had for their hunches and to formulate new questions. These questions were developed and submitted to the teacher. This time their questions requested more specific information for defining the problem (e.g., "How old was he when he was adopted?" "Does his diabetes seem to affect his concentration?"). In addition, they started to develop questions designed to inform their recommendations (e.g., "Would he stay more on task if he were located nearer the front of class or closer to the teacher?" and "Does more challenging work help keep his attention?").

This is an example of one effort to implement problem-based learning (PBL) in an education classroom. This undergraduate approach for student teachers was adopted from the medical model of PBL developed by Barrows (1985), considered by many to be the father of PBL in the United States. This model, aimed at teaching medical students clinical diagnosis, offers much to teacher educators in their efforts to teach clinical diagnosis to undergraduate students.

His approach and the one described at the beginning of this paper start by confronting students with a simulated or real problem: what is happening here? As the students wrestle with identifying and defining the problem, they begin to realize that it can be viewed from very different perspectives, and they need to learn and integrate information from various disciplines. According to Barrows (1985), the problems encountered in PBL require that students find more information than is given in order to define the issues and decide on solutions. In fact, as additional answers are learned, the problem may be redefined in very different ways. Students must make decisions, even though they know that some data may be missing or in conflict with others. Finally, it is critical that the teacher who serves as a resource person (rather than information giver) debrief with the students to make explicit their thinking processes and principles learned.

Although there is a rich literature base on clinical teaching, the use of cases, and reflective practice, these approaches use only some elements of PBL and are seldom even discussed in the so-called PBL literature. This is largely because that literature is dominated by the 25 years of research on the PBL medical model and its recent implementation in K-12 education. Moreover, PBL has not been well defined outside the medical education literature, and there are many approaches that use elements of PBL or that include PBL as an element of a more comprehensive approach. Finally, teachers, teacher educators, and researchers have often used PBL interchangeably with projects or project-based learning with little attempt to differentiate the two. The next two sections address this confusion.

But first it should be asked why it matters that these distinctions be discussed. Foremost, it matters because problem-based learning is a primary attribute of contextual teaching and learning. PBL appears to embrace in a practical way much of what cognitive scientists are learning about the nature of learning as motivated co-construction of meaning. Yet it is not simple to sort out specifically how this is true, so Table 1 is presented in this paper to clarify the points of connectivity (see page 58).

> “
>
> Problem-based learning is a primary attribute of contextual teaching and learning.
>
> ”

Note that this table consists of examples drawn mostly from K-12, simply because that is where most of the activities and literature for PBL and contextualized learning are focused. However, the table is developed specifically for higher education faculty to model and teach undergraduates the different types of learning contexts and their respective features. It is clear that the characteristics of higher education teaching and undergraduate learning must be substantially enhanced if faculty and undergraduates are to design and develop such contexts for teacher education and for K-12 schooling. Thus, there are two separate questions to consider while reading this analysis:

- To what extent can higher education use any of these methodologies to enrich teaching and learning for undergraduates?

- To what extent is it the responsibility of higher education to develop teachers who are familiar with PBL because it is a viable and effective approach for K-12?

What Is PBL and How Does It Relate to Contextualized Learning?

Ever since John Dewey described the benefits of pragmatism, educators have been developing opportunities for students to work together to learn information and solve problems. For the purpose of this analysis, PBL is defined in terms of two intersecting continua. One continuum defines the degree of problem-based learning characteristics—high or low (Finkle 1998). The second continuum depicts approaches that involve varying degrees of contextual learning.

The PBL Continuum

At one end are limited implementations of PBL that are abundant in all the array of activities that engage students in problem solving or research based on a question or problem but do not involve many other characteristics of PBL. These are **Low PBL** approaches.

At the other end of the PBL continuum are **High PBL** approaches. Students define and research their own problems, usually collaboratively with a teacher or other practicing professional. They experience the "messiness" of ill-structured situations that are typical in real-world environment. They assume the role of a stakeholder who is intimately affected by the resolution of the problem. Stepien (1995) and Finkle (1998) have described segments of a PBL instructional sequence. Finkle called these "touchstone" teaching-learning events that must be present for an approach to qualify as fully PBL. There is no rigid sequence in the events.

- **Engagement**: (1) preparing for the role of being self-directed problem solvers who collaborate with others; (2) encountering a situation that invites students to find problems; and (3) searching for the nature of the problem while proposing hunches, action plans, etc.
- **Inquiry and investigation**: (1) exploring a variety of ways of explaining events and implications of each and (2) gathering and sharing information.
- **Performance**: presenting the findings.

- **Debriefing:** (1) examining costs and benefits of the solutions generated and (2) reflecting on the effectiveness of the whole approach to problem solving they have used.

The Continuum for Contextual Learning

The second continuum is defined by degrees of contextualization. This means that students experience the context of learning in the real world in some way. Contextual teaching and learning is defined in the first chapter of this volume as follows:

- Teaching that enables learning in which students employ their academic understandings and abilities in a variety of in- and out-of-school contexts to solve simulated or real-world problems, both alone and in various dyad and group structures.
- Activities in which teachers use contextual teaching strategies to help students make connections with their roles and responsibilities as family members, citizens, students, and workers.
- Learning through and in these kinds of activities is commonly characterized as problem-based, self-regulated, occurring in a variety of contexts including the community and work sites, involving teams or learning groups ,and responsive to a host of diverse learner needs and interests.
- Emphasis is on higher-level thinking, knowledge transfer, and collection, analysis, and synthesis of information from multiple sources and viewpoints.
- Assessment is authentic, derived from multiple sources, ongoing, and blended with instruction.

At the low end of this continuum (**Low C**), students might use the tools or materials of a scientist or author without being involved in the richness of the work process or the thinking processes used by the practicing professional. A highly contextualized learning environment (**High C**), on the other hand, would necessarily involve students in the thinking processes, work environment, and tools of the professional. Students may experience work or community contexts in different ways. In school, students could experience such contexts through novels, documentaries or other video representations, simulations, role playing, or telecommunications. Or students could experience contexts through "working" internships or field trips designed to push forward the work of a sustained inquiry (McMahon and O'Neill 1993), activities that differ sharply in function and quality from episodic field trips and internship activities designed to teach procedures.

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Table 1 reflects four types of learning approaches:

- In Quadrant A are activities and approaches representing rich implementation of problem-based learning (High PBL) and contextualized learning (High C).
- In Quadrant B are activities that the research community would recognize as problem-based learning (High PBL) but which have few elements of contextualized learning (Low C).
- In Quadrant C are activities involving few elements of problem-based learning (Low PBL) but strong elements of contextualized learning (High C).
- In Quadrant D are activities that are low in contextual elements (Low C) and have few elements of problem-based learning (Low PBL).

Table 1
Types of Learning Approaches

Quadrant B: Hi PBL and Lo C • Cases • Simulations • Progressive problem solving • Process drama • Anchored instruction • PBL classroom research problems	Quadrant A: Hi PBL and Hi C • Co-investigations, co-development, and co-learning projects • Expeditions • Sustained internships • Action research
Quadrant D: Lo PBL and Lo C • Isolated hands-on activities • Thematic projects	Quadrant C: Lo PBL and Hi C • Episodic field trips • Service learning • Shadowing • Procedural learning • Activity simulation kits

Examples of Learning in Each Quadrant

Quadrant A. Quadrant A contains approaches that have rich elements of PBL and contextualized learning (High PBL and High C). The following are key characteristics of learning that combine both dimensions and build upon the definition of PBL given by Stepien (1995) and Finkle (1998):

- The focus is on questions or problems relating to real-world issues in which students understand the context in which the problems or issues take place and have opportunities to find and redefine problems.
- Students engage in various metacognitive and social activities to become self-directed learners and members of collaborative learning groups.
- The roles of the teachers and students as co-investigators or co-learners involve sustained inquiry, investigation, or development of a product/service.
- Frequent dialogue with experts and practicing professionals explores hunches, theorems, and action plans and provides some sense of participating in a broader learning community.
- Manipulation of real data and sustained inquiry research take place.
- Opportunities are provided to explore the work conditions and tools in a real workplace—either through remote visits or virtual visits.
- Assessments are ongoing and designed to be formative as well as more structured performance-based assessments presented to a real-world audience (ideally, experts in the subject disciplines involved).
- Debriefing involves the whole class in understanding what was learned by the diverse individuals or groups, the nature of the context and problem-based learning research experience, the nature of the technology used, as well as principles of collaborative learning and communication with professionals.

Good examples of contextualized problem-based learning would be projects that involve students, teachers, and practicing professionals or community members in *co-investigations, co-development, and co-learning activities*. It would also apply to internships and apprenticeships in which students or student teachers were engaged in problem defining and self-directed learning, inquiry and investigation, presentations, and debriefing. Such rich relationships can involve science and development of a product or program.

For example, Sally Boysen, Professor of Psychology and Director of the Chimpanzee Center at the Ohio State University, is in the process of co-developing an educational program with the Columbus Public Schools and Ohio State's College of Education. This 3-year project will involve teachers and students in sustained dialogue with Boysen and her graduate students in site visits and telecommunications. Students, their teachers, and higher education faculty and their students will co-design experiments to teach the chimps analytical, mathematical, and reading problems; co-design equipment for the experiments or living environment; and study and compare chimpanzee life and environment to that of humans. Students will also develop web pages and telecommunications tools for the project, and the activities they develop will be loaded on Boysen's website as a major part of the educational outreach for the center.

Another example of co-development that would be well suited to apply in higher education contexts is the PBL as Co-Development model developed by Jones, Rasmussen, and Moffitt for high school (1996) and for elementary school (1997). This model involves professional development providers working with and supporting teachers to co-develop an implementation of the model with students and case studies that were published in the two books referenced. PBL as Co-Development has five recursive stages:

1. Identifying specific problems
2. Developing a plan of inquiry or work
3. Conducting analysis and inquiry
4. Preparing and presenting the findings
5. Debriefing and consolidating the knowledge

These five stages were modeled for the teachers in professional development experiences, scenarios, and mentoring; in turn, the teachers co-developed units with their students focusing on authentic problems with varying degrees of contextualization.

Expeditions and *internships* also are high in contextual learning opportunities and PBL. In expeditions, students either visit a remote site with a scientist, artist, or other professional; or they follow the travels and research of such a person or team using telecommunications. In internships, students work directly in workplace environments. The CO-NECT schools involve students in both types of activities in sustained learning projects (*http://www.co-nect.com*). The JASON project (*http://www.jasonproject.org*) also involves students and teachers in communication with various oceanographic experts. For example, participants can see and talk to the scientists underwater, explore the tools they use, and address issues of their work environment. Additionally, the project offers internships to students and teachers to work with these scientists in underwater stations or visit rain forests for 2 weeks at a time. During this period they are engaged in problem defining and problem solving with the scientists as in a co-investigation.

PBL Community-Based Projects are sustained projects that involve (1) providing some type of community service or activity such as technology training for elders, research on a local nuclear reactor, or work with state policymakers on pending legislation; and (2) PBL inquiry processes as defined in this chapter. This type of activity is different from service learning as defined by Wade in the next chapter in this volume, which does not necessarily require either investigation, research, or focus on academic subjects An example of a PBL Community-Based Project is the University High School at Illinois State University (Jones, Rasmussen, and Moffitt 1996). Faculty from the university and the high school developed a challenging interdisciplinary problem-solving unit over the course of several years that did not have all the elements of PBL or any contextual component. As part of a state-based high school reform project, they agreed on the following: (1) a focus on problems rather than themes, (2) using the Internet for background research, (3) a focus on gathering information in the community itself to sustain the inquiry, and (4) an actual community component whereby students sought to implement at least the first step of their proposed solution(s) to the community problem they identified.

In terms of teacher education in preservice and inservice contexts, Quadrant A also would include *action research*. This links to the literature from the Holmes Group (1990, 1995) as it defines Professional Development Schools and Professional Practice Schools. Action research in these and other contexts refers ideally to the opportunity for preservice teachers to engage in inquiries, problem finding, and problem solving with practicing teachers in school settings. Thus, the undergraduatelearning environment is highly contextualized because the classroom *is* the work context.

Quadrant B. In Quadrant B, the classification of low contextualization is low only in relation to opportunities such as those in Quadrant A that offer sustained dialogue and inquiry in the workplace itself. Having said that, approaches in this quadrant are very rich in contextual information and learning opportunities and most of them involve some degree of role playing.

Cases are well-structured examples of situations presented by an instructor either before or after students are presented with the content that applies to the case. A variety of case studies have been developed for use in teacher training. Most of these present very specific examples of particular concepts. One highly developed case study can be found in ***Education as an Adventure***, Nicholls' and Hazzard's (1993) description of a second-grade class.

Bridges and Hallinger (1996) developed cases for principals as a means of engaging them in problem-based learning. This course was designed to prepare for a master's degree program at Stanford University. Interviews with the graduates have revealed that the PBL program was evaluated more positively than any other program in that college of education. (The reader is also referred to Borko and Putnam's chapter in this volume for a more in-depth discussion about using case studies to contextualize learning).

At Northern Arizona University, five separate courses have been combined in one experience, an Integrated Secondary Teacher Education Program, which presents three PBL problems (Kain and Mitchell 1997). Each problem involves information concerning curriculum, content-area reading, educational psychology, teaching methods, and assessment. The first problem concerns a question of whether a community should adopt an Afrocentric curriculum. The second presents a variety of perspectives (some conflicting with others) regarding a student's academic failure. The third problem concerns issues surrounding grades based on an "intelligences" portfolio.

Jones, Rasmussen, and Moffitt (1996, 1997) used cases in a different way that could be productive for undergraduates. They asked teachers to create case studies that would be published. Each case study asked teachers to describe a PBL unit they designed and/or implemented and to provide certain kinds of information: an overview of the project, a description of the school or schools they involved, a rationale for the project showing how they applied research to their unit, the flow of the unit and sample activities, and reflections looking back on their development and the work as a whole.

Simulations are powerful ways to emulate context and roles at all levels of education. The clinical diagnosis simulation described at the beginning of this chapter is one example for higher education. One of the PBL models used by the Illinois Mathematics and Science Academy (IMSA) also has great merit for higher education: Problems as Possibilities: Transforming Garbage into Gold. In this model (Finkle and Torp 1997), IMSA engaged 50 middle school teachers in 9 teams in sustained professional development experiences including an authentic service learning activity that would also use all the elements of PBL. It also required classroom teachers to develop instructional materials for a unit on garbage. The inservice project used a problem called the landfill simulation, which provided such artifacts as a letter from concerned citizens, records, and news clippings that stimulated the students' investigation and role playing and also their assessment.

At the secondary level, Stepien, Gallagher, and Workman (1993) reported on two courses taught at the IMSA. In one of the courses, students explored social and ethical issues inherent in controversial scientific issues, e.g., "What should be done about a severely handicapped baby?" In the other course, students developed a deeper understanding of major decisions made in American history, e.g., "How would you bring a speedy end to World War II, ensuring unconditional surrender by the Japanese and a secure post-war world?"

In a higher education problem designed by Pyke and Pourchot (1997), students were cast in the roles of newly hired unit directors at "Sunshine Camp." They were charged with the responsibility of recommending changes that would benefit the campers. The undergraduates were told that previous campers had complained of "too many adults bossing me around," "too many rules," and "nothing interesting to do." Meanwhile camp counselors were reported to have observed that "Kids just don't want to do anything," "Everything is boring to them no matter what the activity," and "Kids were so mean to one another—they need structure." The undergraduates were NOT told that this was a problem in motivation, but they were given opportunities to define the problem from a variety of perspectives. Pyke and Pourchot concluded that their students enjoyed the experience, although they were not convinced that the students learned as much about motivation as they would have during a more traditional class.

Progressive Problem Solving occurs in many manifestations, but among the richest is the Computer Supported Intentional Learning Environments (CSILE) project (*http://csile.oise.on.ca/*) at the Ontario Institute for Studies in Education (OISE). In this model, faculty from the OISE (who are higher education faculty) developed a very effective model of inquiry that involves all the elements of PBL and much more. Specifically, the project takes its research bases not so much from PBL but from research on expert novice differences, in-depth studies of expert problem solving, metacognition and intentional learning, science and mathematics research, and computer science. CSILE has very powerful representations of progressive problem solving as used by experts to guide K-12 students through the processes used by scientists. Specifically, this process helps students to find problems, develop theories and hunches, conduct inquiries, share results, and engage in knowledge building to improve the next cycle of thinking. Thus, the work takes place within communities of practice, and there is a progressively refined cycle of understanding about the problem or phenomenon under study.

Process drama is a method taught in art education that may not involve the students in a complete production of a play or other piece of literature. Instead, the focus is on understanding the subtext, setting, use of music and art, and any sociocultural factors. Consider dramatizing a book such as ***The Bobbin Girls*** set in the late 1800s in the cotton mills of Lowell, Massachusetts, and highlighting the plight of child laborers. Teachers and students might research (1) how the sounds of the machinery could be set to music as a means of deeply understanding the work conditions in the mill; (2) issues of women and children; (3) how a bill becomes law, as illustrated by the child labor laws; and (4) how the plight of women and children was depicted in art. This approach involves various simulations and a lot of role playing rather than acting per se.

Anchored Instruction. The Cognitive and Technology Group at Vanderbilt (CTGV) defined this approach in the Jasper series (*http://peabody.vanderbilt.edu/projects/funded/jasper/*). This series represents a collaboration among the CTGV and the faculty from Vanderbilt's Peabody College of Education. The context for each Jasper problem is contained mostly in interactive videodiscs (essentially rich simulations). Typically, the video revolves around a real-world problem (such as rescuing an injured eagle) and may ask such questions as "Will Jasper have enough time, money, and gas to drive a boat across the lake before nightfall?" Some students would remember that a scene at a gas station happened to show a gas pump listing the current cost. With interactive videodisc or CD-ROM technology, students could quickly find the scene in question and record the information needed. Jasper is probably the most well documented of all cognitive science projects involving technology, and there is consistent evidence that the anchored instruction model is effective in improving scores on numerous research-prepared and standardized measures for mathematics, science, and problem solving (CTGV 1992, 1997). Clearly, anchored instruction, like CSILE, is much more than PBL but does have all the elements of PBL.

An example of anchored instruction for preservice and inservice contexts was developed by Duffy and Jonassen (1992), who presented teachers with a video of an entire class period involving teachers identified as experts by research. Learners could access multiple perspectives on the teaching in audiotaped commentary as well as follow specific elements of teaching such as assessment or metacognitive instruction.

PBL Classroom Research Problems is a catch-all category for the array of PBL problems that are designed by teachers and teacher educators to fit with their needs and curriculum. They may have elements of simulation, role playing, cases, problem solving, and contextual learning. They may be quite complex and elaborate or they may be more focused and simple. An example of this at the high school level may be found in a project focusing on the question: How valid is the American Dream? (Jones, Rasmussen, and Moffitt 1997). This 2-week unit was created by 2 teachers for 110 students in an American Studies high school course. The project integrated information from multiple subjects and involved creating HyperStudio presentations as well as more traditional written components (a project plan, a written narrative of the presentation, and a project evaluation.)

Developing good problems can require much time, effort, and creative writing as the instructor tries to second-guess information that students will request. But teacher education and other programs of study that prepare students for careers do not need to create artificial problems. Creative instructors are able to use teachers' anecdotes or to take advantage of many opportunities for students to solve problems in real-world contexts. At Samford University in Alabama, Carol Dean (1998) is using actual experiences of recent graduates to create a portrait of "Sarah," a beginning teacher faced with a myriad of problems and possibilities.. Undergraduates in a teacher education course identify, define, and try to solve Sarah's problems.

Sophomore students taught by one of this chapter's authors (Pierce) in an educational psychology course were told that they would be presenting a lesson in a second-grade classroom toward the end of the semester. The students made a list of problems they would need to solve and information they would need to learn before that could happen. Then, with the assistance of the instructor and the second-grade teacher, they began to find answers to their questions. Other sophomores were paired with sixth graders who needed to learn study strategies. The undergraduates and the sixth graders exchanged e-mail and faxes while the teacher education majors explored ways to analyze and address the students' needs. The future teachers found that they needed to integrate understandings of motivation, prior knowledge, individual differences, and objectives while they helped the children learn about ancient Greece, the topic of instruction.

Quadrant C. In Quadrant C are approaches that are highly contextualized in that they do take place in a workplace, community, or family setting (High C), but they contain few elements of PBL (Low PBL). Or they may take place in school but are intended to allow students to experience some aspect of a work or community environment through telecommunications, for example. It is important to note that these approaches may be very rich in content and context; they just do not focus on PBL. However, they are often confused with the notion of "ill-structured problems" in problem-based learning, and it is helpful to label them.[1]

- *Field trips*, for example, engaging in dialogue with the docent in a museum, are often focused on learning factual information, are episodic, and may not require any integration of information from multiple perspectives. The same may apply to an electronic field trip, e.g., to a NASA space station.
- Or consider "*shadowing*" an adult role model at work. The learning is clearly contextualized but not necessarily problem based, since the goal is primarily to learn what someone else does in his/her work.
- Similarly, *procedural learning*, or learning the procedures of a scientist or writer, is by definition contextualized by virtue of the focus on understanding the "tools of the trade." It may be highly contextualized if the learners are in a real laboratory or workplace; less contextualized if they are using videos, telecommunications, or role play, novels, or other simulations to experience the workplace. However, it may not be problem focused at all if the procedure is taught in isolation of the process of projects and sustained work or learning.
- The same is true of *service learning* (see Wade's chapter in this volume). The experience is necessarily situated within the community and involves sustained dialogue with experts, but the service learning literature does not seem to focus on the characteristics of problem-focused inquiry as seen in examples in Wade's chapter or other literature.[2]
- Many museums and zoos provide teachers with "*activity simulation kits*" for conducting mini-investigations. An example of this is the landfill simulation in which students insert the garbage from their lunch into a prepared container simulating a landfill to observe how water flows through the garbage. This activity, which may be done at school or a remote site, is contextualized because it is intended to simulate some element(s) of a work or ecological environment.

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[1] Note: Sometimes the activities and approaches described DO have elements of problem-based learning, but in practice they usually do NOT. Such activities may provide good, hands-on experiences, but they are not what the research community would call problem-based learning. It is important that teacher educators understand the difference between these highly contextualized activities that, again, may focus on a problem or question but lack most of the other characteristics of PBL.

[2] Note: Many community-based projects are designed to engage students in PBL but are not called service learning (Jones, Rasmussen, and Moffitt 1997).

Quadrant D. In Quadrant D are teacher-led, structured group discussions of real-world problems provided by the textbook or teacher that have only minimal elements of problem-based learning (Lo-PBL) and few elements of contextual learning (Lo-C). It is important that higher education faculty and undergraduates not confuse these activities or approaches with rich implementations of PBL.

- Consider, for example, "*hands-on*" *activities* as they are implemented in textbooks and many classrooms. Countless activities on the Internet and in classrooms engage students in "messy" problems such as how to measure bubbles, identify the "mystery" material or chemical element, or count the number of elephants in a rapidly moving video. Often such activities are episodic, taught as ends in themselves rather than part of an effort to understand real-world environments, and/or decontextualized from the role of scientist. Thus, although these activities contain elements of PBL and contextualized learning or could be enhanced to have more elements of both, such activities would be on the low end of both continua.
- Another set of activities that seldom involves the full range of PBL characteristics are teacher-led projects in which students do research on a general theme, engage in traditional research activities (looking up information in encyclopedias, books, and electronic materials), and posting their findings on the Web or making a class presentation. *Thematic projects* such as this typically do not engage students in solving problems but rather focus on learning categorical, factual information and would be better characterized as project-based teaching.

How Does PBL Relate to Other Methods?

We have already examined the relationship between PBL and contextual approaches. How does PBL compare to other approaches? Although many comparisons could be made, it is important to distinguish PBL from traditional approaches to instruction. The dominant philosophy in many schools is instruction driven by textbooks or other prepared instructional materials. Typically, the materials structure students through a sequence of skills or concepts, focus on learning factual information and isolated skills, use paper and pencil tests, and define teacher roles as giving information to students who must learn it.

In contrast, the dominant approach in research communities within higher education is some form of constructivism with its focus on constructing meaning in ways that are rich in representations, experiences, contexts, and authentic tasks. This type of instruction is highly social in nature, may have unpredictable elements such as messy data, often is designed to address known misconceptions, and has very diverse instructional strategies and learning strategies that manifest higher-order thinking and problem solving. Teacher roles emphasize such metaphors as coach, guide, mediator, co-learner, and co-investigator. Student roles emphasize learning as problem solving, producing knowledge, exploring, and co-learning. PBL was derived largely from constructivist research, as was the medical model, which drew heavily upon the research for anchored instruction and cognitive apprenticeship (the idea that students are apprentice learners to teachers and experts). (See Jones, Rasmussen, and Moffitt 1996 for elaboration of these approaches.)

Increasingly, state education agencies, districts, and even cognitive scientists are moving toward standards-based and performance-based approaches, which often have some elements of traditional instruction in that they are typically teacher led and may heavily involve paper and pencil tests and activities. However, they provide clear standards of knowledge, skills, and performance. Instructional materials or approaches are then developed to meet the standards and performance tasks. Thus, the test drives the instruction. In the best models, efforts are made to incorporate elements of co-learning and investigation as well as contextualized performances, portfolios, communities of practice, and other constructivist thinking.

What Are the Theoretical Bases and Actual Effects of PBL?

Research provides compelling evidence for at least considering the use of PBL. Blumenfeld, Soloway, Marx, Krajcik, Guzdial, and Palincsar (1991), Norman and Schmidt (1992), and Gijselaers (1996) have reviewed PBL literature. They highlighted evidence that cognitive engagement in tasks has been related to intrinsic motivation and goal orientations that characterize self-regulated students who know and use cognitive and metacognitive strategies. Findings such as these have informed national standards developed by professional organizations representing the content areas, for example, the National Council of Teachers of Mathematics (NCTM), the National Science Education Standards (NSES), and the National Council of Teachers of English (NCTE).

Is there evidence that PBL actually does have these effects? Two meta-analyses of PBL programs in medical schools are commonly cited : Albanese and Mitchell (1993) and Vernon and Blake (1993). Even though these reviews were both published in the same year, they differed considerably in the research considered and the methods of analyses. In addition, there is a growing body of research of the effects of PBL in other contexts. In the discussion that follows and in Table 2, theoretical predictions are compared to research findings. The reader is cautioned to recognize that programs classified as PBL may actually fit in various levels of the continuum described earlier—that some PBL programs included in this discussion do not incorporate all of the criteria.

Effects on Motivation and Self-Directed Learning

According to both meta-analyses and to the Norman and Schmidt review, students engaged in PBL programs do seem to be intrinsically motivated to use self-directed methods aimed at acquiring in depth understanding. Albanese and Mitchell concluded that PBL students did demonstrate different study practices than other students, and these practices reflected different goal orientations. PBL students were more likely to have mastery goals such as studying to understand and to learn information needed to solve problems (Coles 1985; DeVolder, Schmidt, Moust, and DeGrave 1986; Newble and Clarke, 1986). To achieve their goals, PBL students spent more time using library resources and applying strategies that helped them identify and define problems than did students in traditional programs (e.g., Gallagher, Stepien, and Rosenthal 1992; Nolte, Eller, and Ringel 1988, cited in Albanese and Mitchell; Stepien, Gallagher, and Workman 1993).

Retention, Transfer, and Conceptual Change in Collaborative Groups

Insofar as the goals of a PBL program focus on the development of self-regulated study strategies, the results have been promising. However, there have been mixed results concerning the type and amount of content achieved in courses stressing the approach. Both meta-analyses presented evidence that medical students enrolled in traditional programs tended to score higher on standardized measures of basic science knowledge. However, Albanese and Mitchell observed that retention effects tended to be time sensitive. Although the short-term recall of PBL students was not impressive, they seemed to have superior long-term recall, since they had learned the information in more depth.

Table 2
Should PBL Work? Does It Work?

Standards-based categories	**Should it work?** Theory-based reasons why PBL should or should not work	**Does it work?** Conclusions from research
Motivation "The curriculum must take seriously the goal of instilling in students a sense of confidence in the ability to think and communicate mathematically." (NCTM)	"A considerable body of research and theory has shown the link between student motivational orientation and cognitive engagement in schoolwork" (cf. Blumenfeld et al. 1991)	PBL students have been more likely to study for deeper understanding (e.g., Coles 1985; Newble and Clarke 1986). PBL students displayed more interest in the subject and were more willing to study related information and to attend a lecture (DeVolder, Schmidt, Moust, and De Grave 1986).
Self-directed Learning "Mathematics learning is not a spectator sport." (McTighe and Schollenberger 1991)	"Knowledge about problem solving, in general, and about their own mental processes, in particular, helps students become better problem solvers" (Davidson and Sternberg 1998).	Secondary school students who had experienced PBL were more likely to spend time on problem finding (Stepien, Gallagher, and Workman 1993) and brainstorming ideas rather than jumping to a conclusion (Gallagher, Stepien, and Rosenthal 1992).
Retention and Transfer "All mathematics should be studied in contexts that give the ideas and concepts meaning. Problems should arise from situations that are not always well formed." (NCTM)	Providing a context for learning that is similar to the context at the time of recall influences retrieval (e.g., Godden and Baddeley 1975) Solving a prototype problem with feedback transferred nearly 90% of the time versus 60% for students who memorized the problem (Needham and Begg 1991).	Although the initial learning of PBL students may be poorer, they remember the information much longer (cf. Norman and Schmidt 1992). PBL students are more likely to apply scientific knowledge appropriately (cf. Allen, Duch, and Groh 1996). PBL medical school graduates receive higher clinical ratings by their residency supervisors (cf. Albanese and Mitchell 1993).
Conceptual Change "Emphasizing mathematical concepts and relationships means devoting substantial time to the development of understandings." (NCTM)	"Students often have considerable gaps in their knowledge or hold initial preconceptions...that are quite resistant to change. These may interfere with their ability to understand or benefit from information accessed during project-based learning activities" (cf. Blumenfeld et al. 1991).	Tracking data of CSILE revealed that encouraging students to revise earlier notes to reflect their current thinking has resulted in significant conceptual change (Oshima, Scardamalia, and Bereiter, in press).
Small Group Collaboration "Future teachers must engage in collaborative aspects of scientific inquiry. They need to experience the values and benefits of cooperative work as well as the struggles and tensions." (NSES)	Learning together in a cooperative environment promotes student achievement, critical thinking, intrinsic motivation, social competencies, positive attitudes, positive self-esteem, etc. (Johnson and Johnson 1989).	Building the communal knowledge base with CSILE promoted high-level scientific thinking (Hakkarainen 1995).
Teachers' Attitudes "Many teachers come to learning activities with preconceptions about teaching science." (NSES)	"Teachers' beliefs regarding their role, the goals of schooling, and how students learn are frequently antithetical to the assumptions underlying [PBL] approaches (Blumenfeld et al. 1991).	"These results, coupled with the anecdotal report of numerous other studies...strongly suggest that faculty find PBL a satisfying way to teach" (cf. Albanese and Mitchell 1993).

One would surmise that the strongest retention effects after contextual learning should be observed when students encounter a similar context. As Norman and Schmidt remarked,

> Since all the relevant concepts . . . are learned in the context of a clinical problem, usually presented on paper in a small-group setting, they should be more available and better integrated when a similar problem is encountered in a clinical setting. (p. 559)

Accordingly, Albanese and Mitchell found a nonsignificant trend for PBL students to perform better on a standardized measure of clinical content. Additional data regarding clinical skills came from evaluations by residency supervisors who rated medical school graduates. Albanese and Mitchell concluded that there was "a clear trend toward higher ratings for PBL graduates by their clinical supervisors. . . . These are some of the strongest evidence in support of PBL." Vernon and Blake combined a variety of measures of clinical functioning and agreed that PBL students showed significantly better clinical performance.

Effects on the Faculty

Blumenfeld et al. (1991) cautioned that many teachers hold educational beliefs regarding their role, the purpose of school, and the nature of learning that are not compatible with PBL. Furthermore, cognitively based approaches such as PBL—

> require substantial changes in teachers' thinking about the dispositions toward classroom structures, activities, and tasks. . . . A quarter of a century of research and development has suggested that innovation in curriculum and instructional practice requires that considerable attention be paid to . . . professional practice issues of teachers (e.g., teacher efficacy, opportunities for professional development with colleagues, and organizational time and support for teacher reflection. (p. 373)

As Blumenfeld and her colleagues noted, engaging students in complex learning activities can be a messy process that slows down a lesson and leads to more student requests for assistance. Unless teachers are prepared for these events, many would react by simplifying the problem or loosening their standards of evaluation. Nevertheless, Albanese and Mitchell (1993) reported that eight studies at five different institutions all concluded that faculty members were satisfied with PBL.

Recommendations for Teacher Education Programs

These findings of positive faculty evaluations are impressive when one considers the change in role required for an instructor. Moreover, the impact on students cannot be ignored. The authors strongly recommend that institutions of higher education support PBL in any or all of the following ways.

First, because of the research base and increasing data, PBL is an approach that professors and graduating teachers alike should at the very least be informed about, with respect to the core characteristics of PBL, its manifestation in different learning contexts, its history, and the data—including its limitations. Second, it is important to offer PBL as a specialty so that it would be possible to prepare at least some teachers who were actually knowledgeable and skilled in approaches and strategies. Third, faculty need to consider ways to enhance their teaching methods with PBL approaches. Fourth, some schools may want to invest in establishing an institutional outreach and/or research in local schools or around the state in which the institution is located. In this regard, it may be possible to conduct action research in a Professional Development School or have a PDS specialize in PBL approaches and explore ways of maximizing learning. Fourth, it would be helpful to consider cross-institutional collaboration among interested institutions focusing on PBL outreach and research.

In terms of implementing PBL, Stepien (1995) recommended that an instructor approach a PBL experience as a skilled problem solver who has no preconceptions about a solution for the problem at hand. In this role, professors are urged to model and scaffold techniques of reflective problem solving without revealing their own preferred solutions. Blumenfeld et al. (1991) observed that this is not easy for educators who have become experts at presenting lectures and facilitating recitations that focus on one set of correct answers.

Sage and Torp (1997) noted that teachers of PBL are faced with the same type of conceptual challenges as their students. These researchers spent 1 year training educators to develop and use problem-based learning situations. As a result of that experience, they recommended that such programs need to do the following:

- Provide teachers with opportunities to act as learners immersed in PBL experiences and to observe others in the same environment
- Facilitate the development of self-efficacy by challenging the teachers and also supporting their efforts—e.g., modeling and mentoring approaches and strategies and providing a safe microteaching setting to develop their skills
- Provide for opportunities to reflect on their experiences and to network with others who are learning how to teach with PBL
- Prepare teachers to engage in action research evaluating the effects of PBL on their students (action research itself being a form of PBL)

Jones, Rasmussen, and Moffitt (1996) have echoed the need for professionals to belong to a community of practice when they are trying to create and teach PBL. Their approach to teacher preparation involves four aspects: co-development processes, critical friend reviews, involvement of a broader community and public presentations, and multistep debriefing. To promote co-development, they have provided opportunities for teachers to collaborate with each other, with professional development advocates, and with students to negotiate the goals and processes of creating PBL. Critical friend reviews were provided by mentors and others who gave constructive feedback about ideas while the plans are being developed. Members of the public were involved as mentors, as critical friends, or as bodies (e.g., a town council) that assessed the value of the various solutions recommended by students. Multistep debriefing followed the students' presentations of their conclusions/solutions. The debriefing involved reflection on subject area content, the processes, and resources that were used, and problem solving skills that were learned during the experience.

Dean (1998) observed that education faculty members at Samford University began planning for PBL by developing an infinity diagram—identifying and categorizing desired outcomes for their graduates. Then they sequenced the experiences needed, and they blocked courses together in three professional semesters that incorporated sustained experiences in the schools. The core of courses was richly integrated with PBL experiences.

Because Samford is located near a large city, numerous schools have been willing to let their students observe and teach. Dean reported that teachers have been attracted to their graduate program because of their commitment to PBL. This has the potential of leading to seamless professional development beginning with undergraduates learning how to use PBL working with teachers who are well versed in the techniques. Upon graduation, the new teachers have the potential of continuing to work with teachers who are PBL mentors. In addition, Samford offers continuing support for first-year teachers. The university pays for substitute teachers while the recent graduates meet in workshops.

Obstacles and Solutions to Creating a PBL Focus in Teacher Education Programs

Dean identified three major obstacles that Samford has addressed in the process of developing the PBL-based teacher education program:

- **The need to guarantee content.** She described one language arts methods course that has a relatively traditional structure during the first half of the semester. But during the second half, students meet in groups to create curricula that meet the criteria of a rubric developed by the class.
- **The time and commitment needed for faculty planning.** Dean observed that each of the faculty members felt ownership of the program. She traced this back to the way they had generated the infinity diagram by plastering a wall of a comfortable room with "sticky notes" describing desired outcomes. However, she lamented that getting faculty to meet in teams after the program had been planned was harder. At Samford, the entire faculty of a department had bought into the effort. In larger universities, it would be conceivable that PBL would be a focus of a "school within a school." However, when a subset of like-minded professors band together, they may feel as if their efforts are not appreciated by institutions that have traditionally rewarded grant-writing, research, and publication more than planning for teaching.
- **Scheduling conflicts with general education courses.** Fortunately, the university solved this problem by developing a core curriculum that guaranteed that general education courses would be completed before students begin enrolling in teacher education.

Other potential barriers to implementing PBL on a large scale are identified in San Diego State University's PBL web pages (*http://edweb.sdsu.edu/clrit/PBL_WebQuest.html*):

- **Changing the curriculum.** Gil (1992, cited in Aspy, Aspy, and Quimby 1993, p. 23) observed that "changing the curriculum is like moving a graveyard." Faculty members need time to adjust to the shift in thinking as well as time to develop PBL experiences.
- **Student resistance.** Many students have not been prepared to be responsible and independent learners. (See the Paris and Winograd paper on self-regulated learning in this volume.) They need a clear orientation to the expectations of PBL and effective communication about their roles.
- **Lack of efficiency.** PBL courses are not as efficient as lectures, which typically present the same amount of information in 22% less time (Shahabudin 1987). Of course, efficiency may be irrelevant if the information is not retained as effectively in long-term memory. Furthermore, most teacher education programs are not likely to use the PBL approach exclusively. Future teachers need to be acquainted with a variety of methods. Stepien (1995) has described a "posthole" approach to PBL—inserting a problem in the midst of a course rather than devoting the whole course to the procedure. In addition to a possible cost of time, higher monetary costs may also be associated with PBL. Some approaches require a number of small seminar rooms and sufficient copies of library resources. Albanese and Mitchell (1993) noted that PBL can be used when as many as 100 students are enrolled in a class, but it is more economical for classes with fewer than 40.
- **Staff development.** Faculty who have spent years perfecting their lecturing techniques need to develop coaching skills. For instance, they need to learn how to resist the urge to supply an answer when students are struggling with a problem.

Strategies for Representing Problems and Processes

As teachers or teacher education students are coached through the process of developing and solving PBL problems, they need to become familiar with various strategies for representing the thoughts and work involved. There are rich representations in the field around several points in PBL. First, students need help in representing learning. Consequently, problem-solving programs such as CSILE frequently have incorporated metacognitive supports. Many students engaged in PBL need encouragement to record their hypotheses, questions, and evidence. Blumenfeld et al. (1991) recommended that students need to use two levels of metacognition—*strategic* to monitor general cognitive processes and *tactical* for more precise management of their efforts. As students learn how to represent their thoughts and thought processes at different stages of PBL, these representations can be used as formative and summative assessments.

Second, teachers need help in representing teaching and learning. Jones, Rasmussen, and Moffitt (1996, 1997) developed a full set of templates and tools for conceptualizing planning, monitoring, and assessing PBL units for student learning. These include, in the 1996 volume, a figure depicting the main tasks for developing a PBL unit (in practice, this graphic is accompanied by a scenario of four teachers discussing how to implement each step); a management template for developing outcomes and standards in the same model; and a graphic illustrating the flow of the PBL project developed by the University High School described earlier. The authors further required teachers to develop one or more representations as part of their case studies. In the 1997 volume are a figure from Edison middle school representing student roles and multiple intelligence attributes and a figure depicting the flow of the PBL unit developed by IMSA on landfill.

Concept mapping is very commonly used to represent ideas and principles and their connections as well as to move forward the conceptual work of the project. Table 3, prepared by Pierce for this paper, is an adaptation of a widely used reading strategy developed by Ogle (1986). She used this representation both to guide instruction and to record its progress so that it was a valuable artifact for a portfolio.

Monitoring and Assessing for Various PBL Stages

In the early stages of a PBL experience, students need to *identify* whether a problem exists and to *define* what a problem might be. Musial (1996) suggested that students might record these thoughts in a journal, create a semantic map, or even present their ideas formally. Again, these representation strategies also serve as assessments. In the *planning* stage of a PBL event, Musial recommended that students learn how to use task analyses, timelines, or flowcharts, to create a proposal and/or a budget.

When students are *gathering data*, Musial urged that they be shown how to record their data. This may take the form of a table, a chart, field notes, or a recorded interview. This process may be iterative in that, as students record hunches and gather information, they may generate new hunches that require gathering additional data.

Table 3
Defining Hypotheses

Hunches defining problems	**What I know** Rate the certainty of knowing each observation 1 - Very Certain 2 - Certain 3 - Uncertain 4 - Very Uncertain	**What do I want to know?** Prioritize your questions. 1 - Highest priority Where will I look for an answer?	**Answers to questions** How useful is each answer?
Hunch 1	(A) (B) (C)	______________ ______________	______________ ______________
Hunch 2	(A) (B) (C)	______________ ______________	______________ ______________
Hunch 3	(A) (B) (C)	______________ ______________	______________ ______________
Hunch 4	(A) (B) (C)	______________ ______________	______________ ______________

After the data have been collected, students may be expected to *analyze* them and produce a summary of their findings. In some cases, this may involve a statistical analysis of data supporting opposing solutions. In other cases, descriptive statistics may be sufficient to present data that support a recommendation.

In one of the final stages of a PBL unit, students *share their conclusions*. Musial suggested this might be in the form of an exhibit or a recital, a speech or a debate. Having an "authentic audience" is particularly motivating at this stage. It is absolutely critical to develop both standards and rubric that are shared at least by the teacher and students, if not by any participating audiences and expert mentors. Our experience in working with 40 other schools in the past 5 years indicates that this is a major limitation in the practice of PBL and other related instructional approaches. Many teachers in K-12 education and higher education are accustomed to grades without making the criteria explicit or reflecting real-world standards.

Further, it may be argued that merely presenting one's findings is only a beginning to demonstrate and consolidate what is learned. Part of the reason for this is that if many groups are working in related areas, it is critical to have some procedures for analyzing and sharing the findings across all groups: How were they similar? How were they different? What insights can be gained from making overarching principles explicit? Therefore, we suggest that faculty and teachers use this as an opportunity to *debrief* what has been learned in several areas: content, skills, PBL and inquiry processes, technologies used, communication and collaboration skills, and problem-solving strategies. It may also be appropriate to debrief learnings about the workplace and tools of experts or other elements of the context. It is very helpful to develop forms or templates for debriefing in each of these areas to make more explicit the principles and concepts as well as to consolidate what is learned and to clarify next steps.

Monitoring Conceptual Change

Throughout the PBL process, students need to make a variety of decisions. For instance, they may be confronted with multiple possible solutions, ambiguous answers, and a need to make recommendations before some of the questions can be answered. They need help with monitoring their decision making.

One of the authors (Pierce) has used a technique known as **EXPLORE** to help students work together through the decision-making process when they encounter anomalous data. The procedure is based on conceptual change literature (cf. Chinn and Brewer 1993) and is similar to Johnson and Johnson's (1998) cooperative procedure of simultaneous explaining. In the first step, students list all of the choices and **Examine** each one. Individually, students rate how strongly they agree with each choice (Strongly Agree, Agree, Disagree, Strongly Disagree). Next, students form **Pairs** based on the degree to which they *differ* in their ratings. In the third step, students **Listen** to each other explain why they prefer or disagree with each choice. Whenever students in a pair disagree about a rating, they are instructed to listen well enough that their partner agrees that they have accurately summarized the opposing arguments. Suppose that undergraduates support very different recommendations for an educational plan for a student with attention deficit disorder. One problem solver prefers using behaviorist treatments, whereas the other favors a learner-centered approach. As they explain their arguments, each one is entered into a list. The next step is to **Organize** the information into a matrix. To do this, they need to connect arguments that are somehow related and identify the basis for each relationship. The fifth step is for each student to engage in **Research** to find additional evidence and support that need to be considered in the matrix. Finally, the students **Evaluate** the information in the matrix and decide whether the evidence favors one position over the other or whether one approach might be preferable under one set of circumstances and the other approach would work better in another situation.

Conclusion

Problem-based learning is becoming an increasingly popular approach to use in a variety of settings with students of all ages. It is particularly appropriate for use in programs that are designed to prepare students for careers and community situations that involve ill-structured problem solving. As educators form partnerships with practitioners in the field, they can provide students with more than enough real-world problems. As students wrestle with authentic problems, they learn the information and problem-solving processes that they will need. They become apprentices who experience the difficulties and processes inherent in constructivism. As they encounter "messy" problems, they need to acquire cognitive and metacognitive strategies that facilitate their work. These experiences will help equip them to become skilled practitioners prepared to meet the challenges of their chosen careers.

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Community Service Learning: Collaborating with the Community as a Context for Authentic Learning

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Community service is a long-standing tradition in U.S. society that has recently engendered great interest in the educational arena, notably through the blending of service, reflection, and academics known as service learning. Service learning is more than community service. Whereas community service is usually conducted as an extracurricular volunteer activity, service learning is a pedagogical method in which service activities form the basis of *learning from experience*. According to a diverse group of service learning educators organized as the Alliance for Service Learning in Education Reform (ASLER), service learning can be defined as follows:

> A method through which young people learn and develop through active participation in thoughtfully organized service experiences that—
>
> - meet actual community needs and that are coordinated in collaboration with the school and community;
> - are integrated into each young person's academic curriculum;
> - provide structured time for a young person to think, talk, and write about what he/she did and saw during the actual service activity;
> - that provide young people with opportunities to use newly acquired academic skills and knowledge in real life situations in their own communities;
> - enhance what is taught in the school by extending student learning beyond the classroom; and

- help to foster the development of a sense of caring for others (ASLER 1993, p. 1).

Usually, service learning experiences involve students working with others outside of the school; the local community thus becomes the context for students' service and learning. For example, service learning projects might include developing a nature trail as part of the science curriculum, writing pen pal letters to senior citizens as a means of developing language arts skills, or conducting a voter registration campaign as part of a social studies unit. In addition to these direct service experiences, many school-age youth participate in indirect service learning projects such as fundraisers, canned food drives, or recycling collections, and some take part in advocacy activities such as letter writing, lobbying, or public campaigning to make positive changes in their community. Service learning projects can also focus on problems or needs within the school. For example, conflict mediation programs and cross-age tutoring projects provide needed support for students at many schools.

> “Service learning provides a context for students and teachers to learn *outside* of the traditional school building.”

Just as learning within academic settings may be viewed as both a social and a community endeavor, service learning provides a context for students and teachers to learn *outside* of the traditional school building. Their forays into the community bring them in contact with others and with the environment in new ways that lead to changes in what and how students learn, in how teachers understand the communities in which their students reside, and in the health and well-being of the community itself. Service learning experiences provide opportunities for students to learn valuable skills and knowledge that can be applied now and in the future to their lives in the neighborhood and workplace. Learning through experience in community settings can be powerful learning, consistent with what we know about the nature of cognition as situated, social, and distributed (Borko and Putnam, in this volume).

During the past decade, service learning has been increasingly viewed as a pedagogical approach that can improve both K-12 instruction and teacher education. Advocates have asserted that service learning may positively influence students' academic skills, problem-solving skills, critical thinking skills, moral reasoning, social responsibility, self-esteem, assertiveness, empathy, civic responsibility, political efficacy, and career awareness (Alt and Medrich 1994). The research to date, although limited and inconsistent, suggests that indeed there may be positive relationships in these areas, and certainly that there is a need for additional research and evaluation to assess more clearly the impact of service learning on K-12 instruction.

Research on K-12 Student Outcomes in Service Learning Programs

The benefits of service learning for school-aged youth provide an important rationale for including service learning in preservice teacher education: Without a compelling case for service learning at the K-12 level, there would be little reason to advocate service learning in teacher education. Although the research as a whole is far from conclusive at this point, "findings from studies of high quality programs (e.g., those with strong reflection components, considerable time spent on service, and focused program goals) are promising" (Wade and Saxe 1996, p. 346). The following discussion focuses on student outcomes in the areas of academic achievement, social and personal development, political efficacy, and future civic participation. This discussion is based on reviews of the literature on K-12 student outcomes in school-based service and service learning programs by Alt and Medrich (1994), Conrad (1991), Root (1997), Wade and Saxe (1996), and Waterman (1997).

Academic Achievement

Academic outcomes related to subject-matter achievement, grades, higher-order thinking skills such as analysis and problem solving, and academic engagement have been studied, although the research evidence in these areas is still limited. The lack of data may be related both to the programs themselves and to the aspects of service learning on which researchers have focused. Williams (1991) observed that few experiential education programs focus on improving academic achievement, and Conrad (1991) noted that researchers have tended to steer away from the acquisition of facts and concepts as a focus of inquiry. Despite these limits, there are findings related to academic achievement that warrant attention.

Root (1997) identified several studies that have shown service learning to have a positive effect on content knowledge when the service activity is directly related to the course subject matter:

- Students in an international environmental project showed significant gains in scientific knowledge (Silcox 1993).
- Students who completed local government internships demonstrated a higher level of knowledge about local government than students in traditional classes (Hamilton and Zeldin 1987).

- Students who visited a food bank were "better informed" about the problem of hunger than students who did not (Dewsbury-White 1993).

Studies using measures of behavioral engagement such as attendance and time on task have also been positive. Melchior and Orr (1995), Luchs (1980), and Brill (1994) all observed increases in attendance, and Melchior and Orr also found increases in hours doing homework.

An evaluation of 17 middle and high school service learning programs funded by the federal Learn and Serve America initiative provides the most promising findings to date in regard to academic achievement. Learn and Serve participants scored significantly higher than comparison group students on 4 of 10 measures of educational impact—school engagement, school grades, core grade point average, and aspiration to graduate from a four-year college (Melchior 1997). It is important to note that the sites for this study were specially selected as *exemplary* programs that included in-depth service experiences, connections with academic coursework, and considerable time spent on reflection. Melchior (1997) noted that this evaluation was "not designed to address the average impact of all Learn and Serve programs, but rather to identify the impacts that can be reasonably expected from mature, fully implemented, school-based service learning efforts" (p. 3).

Most studies that have found improvement in grades have focused either on students with initially low academic achievement (e.g., students with disabilities, "at-risk" students) or on tutoring-centered service learning programs. Students who increased their problem-solving skills as a result of service involvement had the greatest gains when the problems on their skills tests were similar to those they had experienced in their field placements. Thus, academic gains appear most likely for students who begin with low achievement levels or who participate in programs where there is a good fit between the service experience and the measures of academic achievement that are used.

Social and Personal Development

The most frequently assessed aspects of student development through service learning are self-esteem, personal responsibility, and social responsibility. Conrad (1991) concluded that "the most consistent findings of studies of participatory programs is that these experiences do tend to increase self-esteem and promote personal development" (p. 543). Not every study has been positive, but many have noted growth in self-esteem, competence, or general self-worth. Of the studies examining the effects of school-based service on self-esteem, "the majority of studies have shown a relationship" (Root 1997, p. 50). Alt and Medrich (1994) refer to "a consensus of opinion expressed by teachers and students about positive gains in this area" (p. 9).

Modest gains in social and personal responsibility have also observed in a number of studies, usually as measured by the Social and Personal Responsibility Scale developed by Conrad and Hedin (1991). Although some studies have produced inconsistent results (e.g., gains for one gender, grade level, or subscale and not for another), "most studies have demonstrated a link between service learning and social and personal responsibility" (Root 1997, p. 48).

Political Efficacy

The findings on whether service learning enhances political efficacy—the belief that one can positively influence the political process—are mixed (Alt and Medrich 1994; Root 1997; Wade and Saxe 1996). Although some studies have found modest gains, others have observed no statistically significant differences, and a few are difficult to judge because of research design or presentation flaws. It does appear, however, that when service learning programs do *not* tie their activities specifically to political issues or organizations, participants are unlikely to increase their political efficacy.

Future Civic Participation

A critical question in regard to service learning outcomes relates to citizenship ethic: Are precollegiate students who engage in service learning more likely to become involved in the civic life of their communities as adults? Although the finding is by no means universal, the majority of studies on this issue suggest that service learning experience in one's youth is likely to have a positive impact.

Two nationwide studies by Independent Sector revealed that early community service experience is a strong predictor of volunteering for both teens and adults (Hodgkinson and Weitzman 1992a,b). They further found that the school plays an essential role in student participation: School-age youth who were *asked* to serve their communities through school activities were more than three times as likely to get involved than those who were not asked. Other studies, which surveyed adults who had had service learning experiences in high school, found that they were more likely to be politically and socially active in their communities than their peers who had not had service learning experiences in high school (Wade and Saxe 1996).

Limitations of Research on K-12 Student Outcomes

Clearly, more well-designed research studies on the effects of service learning on K-12 students are needed, due to inconsistent findings, problems with the research, and sheer lack of data. There is at least some inconsistency in every outcome area discussed earlier; at best, the findings to date are mixed. Researchers have suggested that the inconsistencies can be partly attributed to differences in service learning program characteristics. Specifically, educators have noted—

- The importance of considerable time spent on reflection, increased intensity and duration of the service experience, and matching of the service activity with program goals (Eyler and Giles 1997; Root 1997; Wade and Saxe 1996)
- The positive impact of programs that provide students with autonomy, challenge, and supportive relations with adult staff (Root 1997)
- The possibility that certain student characteristics such as age, gender, social class, academic ability, and prior service experience may mediate the impact of service learning experiences on students (Root 1997; Waterman 1997)

Limitations also exist in the research itself, in three broad areas. First, there are difficulties in assessing the effects of service learning—for example, different effects from different types of participation, outcomes focused on broad and stable personal characteristics that do not change quickly and are not measured easily, or focusing on specific outcomes that a program was not designed to achieve. Second, there have been design problems in some research studies (e.g., failure to include a control or comparison group in an experimental study, failure to include pre-testing in an experimental study, no description of the service experience, only anecdotal evidence reported, or no means for determining if the changes measured could be attributed to the service component of the curriculum. Third, studies have suffered from inadequate or inaccurate reporting of research results (Wade and Saxe 1996).

Finally, there simply has not been enough research. Because service learning is a relatively new educational method, research studies on its effects are limited at this point in time. Serow (1997) asserts that the educational policies that have brought service learning into the educational spotlight "have been based more on expectations of potential impacts than on hard evidence of actual outcomes" (p. 13).

The limitations related to difficulties measuring student outcomes and the resulting inconsistency in research findings are likely to persist. However, ample evidence exists to suggest that service learning should be included in K-12 and teacher education programs. In addition to promising findings in the areas of academic achievement, personal and social development, and future civic participation, as well as evidence from studies that focused on high-quality programs, there is one salient finding of almost every study on service learning: "Participants, their teachers, their parents, and their community supervisors overwhelmingly agree that their programs were worthwhile, useful, enjoyable, and powerful learning experiences" (Conrad 1991, p. 545).

Rationales for Service Learning in Teacher Education

If the promising research findings and the level of excitement about service learning programs argue for their inclusion in K-12 schools, then they also argue for including service learning in teacher education programs. Providing teachers with training and experiences in service learning methodology can only enhance the quality of precollegiate service learning programs. There are other rationales as well for including service learning in teacher education.

First, service learning provides a means of connecting with students on multiple levels and motivating them in both academic and non-academic areas of development. Teachers are challenged to find effective means for engaging *all* youth in the learning process. They must be concerned not only with students' academic progress, but with their emotional and social development as well. Root (1994) noted that there is a growing recognition among educators that schools cannot address children's cognitive needs in isolation from the often difficult circumstances of their lives. In a learner-centered classroom, teachers can employ service learning as one effective means for increasing student achievement and motivating students to grow personally and socially through meaningful involvement in their schools and communities. Service learning experiences can also contribute to developing student-sensitive curricula and instructional tools, establishing caring relationships with students, and enabling prospective teachers to act as advocates for youth in partnership with youth service providers (Root 1994).

Second, service learning has the potential to become a valuable component of teacher education programs aimed at preparing teachers to work within our multicultural society. Young (in this volume) presents a compelling case for the importance of teachers prepared to work effectively with children from cultures other than their own. Service learning can provide preservice teachers with opportunities to get to know children and families from a variety of cultures and to work with them in recreation centers, social service agencies, and other community settings. Carefully structured reflection activities can enable preservice teachers to question their assumptions, overcome prejudices, and develop healthy expectations for the children of other cultures they may someday teach, so that their teaching will be more effective and student learning will be enhanced.

Third, service learning can serve as an umbrella under which many other educational reforms aimed at authentic learning can be actualized within a meaningful and practical context. Service learning is consistent with other educational reforms aimed at authentic learning (Root 1994; Toole, Toole, Gomez, and Allam 1992) and can provide a real-world context for democratic classroom practice, performance-based assessment, school-to-work experiences, thematic units, cooperative learning, character education, and higher-order thinking skills (Wade 1997a). Service learning supports these varied initiatives by involving participants in working with others as a team; exercising leadership skills; acquiring, organizing, and interpreting information; thinking reflectively; and analyzing the moral nature of civic involvement.

Fourth, service learning provides an effective component of a reflective teacher education program. Sullivan (1991) noted that placements in unfamiliar settings in the community can encourage prospective teachers to question prevailing policies, examine their assumptions about classroom practice, and begin to develop habits of personal reflection. Allam and Zerkin (1993) asserted that through reflection on their own learning, preservice teachers "gainexperience working with their colleagues to research issues, make decisions, and solve problems" (p. 12). As previously noted, research has shown that reflection is a critical component in helping students learn from their experience (Conrad and Hedin 1991; Serow 1991); thus, experience coupled with reflection is likely to strengthen teacher educators' efforts to develop reflective teachers as well as enhance beginning teachers' valuing of the role of reflection in student learning (Wade 1997b).

Finally, service learning enables teacher education students to try on a variety of roles in the classroom. Increasingly, teachers are being called upon to serve as counselors, community liaisons, and moral leaders for their students. Through service learning, prospective teachers can learn to use community resources and youth-serving systems and to gain a better understanding of the home and community environments influencing children's lives (Allam and Zerkin 1993; Toole et al. 1992; Wade and Anderson 1996).

Early investigations suggest that service learning in teacher education is associated with benefits to prospective teachers in each of these areas. The studies described here, which have focused on preservice and inservice teachers' experiences with service learning, provide insight into both the outcomes of service learning involvement for teachers and effective practices for service learning in teacher education.

Research on Preservice and Inservice Teachers' Experiences with Service Learning

Research on preservice and inservice teachers' service learning experiences is limited at this time. However, the results of the few available studies are largely positive. This review includes both published and unpublished papers addressing outcomes for teachers as well as a variety of personal and contextual factors affecting teachers' service learning involvement.

Service Learning in Preservice Teacher Education

Several studies have focused on preservice teacher education students' experiences, with largely positive results in terms of personal impact, attitude about service learning as a teaching strategy, and commitment to teaching:

- In almost all of the studies located for this review, teacher education students on the whole felt positive about their service learning experience (Anderson and Guest 1993; Boyle-Baise 1997; Flippo, Hetzel, Gribonski, and Armstrong 1993; Green, Dalton, and Wilson 1994; Salz and Trubowitz 1992; Seigel 1994; Sledge and Shelburne 1993; Wade 1993, 1995b, 1997a; Wade and Yarbrough 1997). Teacher education students often asserted that service learning was fun or a powerful learning experience, and that it led to feelings of personal satisfaction or made a significant impact on their lives.

- A study of students' involvement in a methods course and related practicum led to gains in self-esteem, self-efficacy, increased knowledge about service and other people, and increased connections with others (Wade 1995b).
- Students in several studies became more positive about using service learning as a teaching strategy (Anderson and Guest 1993; Wade 1995b; Wade and Yarbrough 1997).
- Two studies that compared service learning participants with control groups of teacher education students found that program participants developed a greater commitment to teaching than nonparticipants (Flippo et al. 1993; Green et al. 1994).

Several studies suggest that service learning helps build sensitivity to diversity and a greater capacity to serve a multicultural student body. For example:

- Studies of teacher education students' involvement in community or school settings revealed that students often increase their awareness and positive views of youth who are culturally different from themselves (Boyle-Baise 1997; Kwartler 1993; Seigel 1994; Wade 1993, 1995b).
- Kwartler (1993) noted that students who began a service learning experience with negative views about the homeless began to rethink their values and beliefs as a result of their first-hand contact.
- Seigel (1994) found that students' journals reflected increased sensitivity to diversity and insights about teacher education students' responses to diverse youth.
- Researchers in Houston found that service learning was an effective strategy for fostering preservice teachers' abilities to view their students through a cultural lens and to enhance their commitment to teaching in an urban multicultural environment (Tellez, Hlebowitsh, Cohen, and Norwood 1995).
- In two other studies, teacher education students working with youth from cultures different from their own became aware of their prejudices and grew to accept or affirm others' cultures (Boyle-Baise 1997; Seigel 1994).

Findings on teacher education students' abilities to think about the larger societal context influencing people's lives are less conclusive. It was found that service learning contributed to students' complexity of thinking about social problems along two dimensions—differentiation (the ability to identify various subgroups affected by a problem and to propose differentiated solutions) and information gathering (the recognition of the need to obtain information pertinent to a problem) (Batchelder and Root 1994). However, limitations were observed in students' ability to question the economic aspects of living in poverty (Boyle-Baise 1997) or to develop a stronger commitment to social justice (Vadeboncoeur, Rahm, Aguilera, and LeCompte 1996) as a result of their service involvement.

Teacher education students' experiences were not without challenges, especially with regard to working with children from different cultural backgrounds. For example, both Wade (1995b) and Boyle-Baise (1997) described students experiencing frustration, sadness, or feelings of being overwhelmed as they encountered children and families with many needs. Similarly, Wade (1993) observed initial feelings of confusion and fear as some students embarked on getting involved with "different" others. However, most students in these studies overcame these feelings to find value and personal satisfaction in their service learning experience.

Teacher education students also realized some of the challenges involved in implementing service learning as a teaching strategy (e.g., those related to time, logistics, and student management), yet they still developed a strong commitment to integrating service learning into their future teaching (Wade 1995b, 1997a; Wade and Yarbrough 1997).

A great nationwide interest in incorporating service learning in preservice teacher education was revealed in response to a recent survey mailed to over 1,100 teacher education programs in the United States. Approximately one-third of the programs reported experience in or interest in service learning: over 200 indicated they were currently integrating service learning in their programs and 175 expressed interest in learning more about doing so (National Service Learning in Teacher Education Partnership 1998). Although few of the responding programs have had extensive service learning components for more than a couple of years, the groundswell of new programs and interest points to the critical need for research on service learning in preservice teacher education.

Service Learning in Inservice Teacher Education

Several research studies have focused on the service learning experiences of inservice teachers—either beginning teachers (in their first 3 years of teaching) or more experienced classroom teachers. Overall, these studies suggest positive impact on youth and on the teachers, reveal limited implementation by new teachers, and identify a number of factors that affect whether service learning is implemented.

Teachers noted students' increased motivation and learning, enhanced empathy and concern for others, and the development of collaboration and communication skills. Additional benefits cited by both novice and experienced teachers include opportunities for creativity in developing curriculum; positive recognition from administrators, faculty, and parents; community benefits; and public attention through local media (Seigel 1997 Wade, Anderson, Yarbrough, Erickson, Pickeral, and Kromer 1998).

Many studies of beginning teachers as well as research on more experienced service learning teachers indicate that teachers' initial reasons for involving students in service learning are to enhance their self-esteem and social responsibility and that the strongest perceived benefits of service learning activity are positive outcomes for youth (Seigel 1997; Wade and Eland 1995; Wade 1995a, 1995b, 1997c). The words "excited," "enthused," and "proud" are common among teachers' descriptions of their students engaged in service learning activities.

Most beginning teachers who conducted service learning projects felt their projects were successful in enhancing student learning and personal/social development (Wade et al. 1998). When asked how one would know if a project was successful, one beginning teacher replied, "You hang out for 10 or 15 years and when your former students start coming back and tell you all the great things they did, then you know it was a success" (Wade et al. 1998, p. 17).

Implementation of service learning by beginning teachers tended to be limited, however. For example, two studies of Seattle University graduates who had had service learning training revealed that lessthan one-quarter of the teachers who responded (approximately 50% response rate) implemented service learning in their first year of teaching (Anderson, Connor, Greif, Gonsolus, and Hathaway 1996; George, Hunt, Nixon, Ortiz, and Anderson 1995). In the study conducted by George et al. (1995), the rate of service learning implementation was not significantly different from a comparison group of teachers who had not had service learning training. On the whole, when beginning teachers did conduct service learning projects, their projects were strong in terms of collaboration, curriculum integration, and meaningful (though usually short-term) service but could have been improved with more hours spent on service and more in-depth reflection and assessment components (Wade et al. 1998).

The researchers also looked at factors that affected the teachers' decision whether to implement service learning. Teachers in the two studies conducted by Anderson et al. (1996) and George et al. (1995) cited the time demands of first year teaching and the extent of support provided by the school as factors influencing their decision whether to implement service learning. In another study of Seattle University graduates, Chung, Martin, and Mele (1996) found that resource support and high-quality preservice training in service learning were essential for beginning teachers' success.

A recent study of teachers in their first 3 years of teaching also revealed the importance of both time demands and external support in the decision to implement service learning (Wade et al. 1998). Of the total sample in this study—344 full-time teachers from four different teacher education programs that incorporated service learning—96 (28 percent) had used service learning in their teaching. Statistical analyses of a survey completed by all participants pointed to the influence of two factors: having done a service learning project during student teaching and school support (planning time, funds, administrative support, and so on).

Experienced teachers shared similar concerns about service learning that beginning teachers indicated: finding time to plan and include service in the school day, managing all the logistics, and dealing with unforeseen difficulties (Shumer 1994; Wade and Eland 1995; Wade 1997c). As with beginning teachers, however, the perceived benefits outweighed the difficulties, leading teachers at both levels of experience to profess a strong commitment to incorporating service learning in their teaching (Seigel 1997; Wade 1995b, 1997a; Wade and Eland 1995; Wade et al. 1998). This commitment was especially evident among the beginning teachers who were not currently implementing service learning; almost all indicated that they planned to spend more time on service in the curriculum in the future (Wade et al. 1998).

Service Learning in Preservice Teacher Education: A Case Study

Service learning can be incorporated in preservice teacher education in a variety of ways: through various courses, practica, student teaching, community internships, action research projects, and conferences. The following case study describes a hypothetical teacher education service learning program that includes several of these options. This case study of the "Central State University" program—a composite based on actual practice in several teacher education programs, notably Seattle University and Providence College—details the experiences of a hypothetical student, Jennifer Collins. Jennifer's experiences provide examples of best practice as well as difficulties and obstacles faced by teacher educators as they embark on the development of service learning experiences for their future teachers.

Central State University

Several teacher educators in the preservice teacher education program at Central State University (CSU) have worked together for 4 years to create multiple experiences in service learning for their teacher education students. The program includes service learning in four components: (1) the "Strategies of Teaching" course and a related practicum in the local school district; (2) the "Human Relations" course and a related community internship in a local social service agency; (3) optional completion of a service learning project in student teaching; and (4) creation of a service learning portfolio presented at a capstone "Service Learning Conference."

Philosophical, financial, and participatory support for the extensive offering of service learning experiences at CSU comes from several sources. The CSU program faculty recognize the importance of service learning in fulfilling program goals and the University's mission. All eight CSU faculty participated in a day-long service learning project at a homeless shelter, an experience that gave them first-hand knowledge of the value and power of service learning. Financial support has been provided through grants from the Corporation for National Service, whose funds have allowed the CSU faculty to increase the quantity and quality of the service learning components more quickly than they might have otherwise. Finally, essential participatory support is provided by the K-12 schools and community partners involved with the program; without their participation CSU students could not truly experience service learning.

Getting Started: The Strategies of Teaching Course and Practicum

When Jennifer Collins first heard the term "service learning" in her Strategies of Teaching course, she wasn't sure what it meant. Most of the other teaching strategies listed in the course syllabus—cooperative learning, whole language, role play, portfolios, and the like—were somewhat familiar to her from her Foundations of

Education course the previous semester. Fortunately, her professor, Dr. Moreno, provided reading materials and a short video to help orient the students to the essential elements of service learning. Knowing that she would soon be headed out to Marshall Middle School to help with a service learning project for the practicum component of the course, Jennifer was motivated to ask questions and carefully read the handouts. She also found that an initial assignment—to write about and then discuss in class the experiences she had had with community service—helped her remember that she had participated in a variety of service activites in her 19 years of living, though mostly outside of school. The reflection opportunity also helped Jennifer realize that several of these experiences had been valuable learning opportunities for her and had a made a difference in the lives of others as well. By the time the practicum began, Jennifer was excited about assisting a class of middle school students in realizing the value of service.

Jennifer was placed with a seventh-grade English teacher, Mr. Thornton, for 2 mornings a week for the remaining 10 weeks of the semester. Jennifer was especially lucky to work with Mr. Thornton: he had received a small grant through the Learn and Serve program in their state and had given presentations about his project, "Partners in Reading and Serving," at several regional meetings over the past 3 years. According to Dr. Moreno, all the practicum teachers had received service learning training, either through inservice workshops offered through the school district or a through a graduate course at CSU. The three-credit CSU course provided opportunities for school teachers to develop collaborative projects, reflect on their practice, brainstorm together to solve problems that arise, and reevaluate outcomes for preservice teachers and K-6 students. Yet as Jennifer compared notes with friends in the course, none of them had been placed with a teacher as skilled in service learning as Mr. Thornton.

Partners in Reading and Serving (PRS) partnered volunteers from the local senior center with middle school youth to read the same book, participate in a dialog journal about it, and then develop a service activity they could complete together over a short period of time. The books were chosen by the students from a list provided by Mr. Thornton, each book focusing on a social issue such as poverty, homelessness, animal rights, or the environment. The service activities conducted by the intergenerational pairs were related to the book theme, providing an opportunity for the youth and the senior to make a difference in the community. In the past, some senior/student pairs had written letters to the editor or a state representative, whereas others had cleaned up a park, conducted a storytime at the homeless shelter, or helped serve a meal at the local soup kitchen.

During her first visit to the school, Jennifer learned about the PRS project but was uncertain what her role would be. Expectations were clarified when she and Mr. Thornton sat down together after school, reviewed the requirements in the practicum handbook provided by Dr. Moreno, and developed a plan for the remainder of Jennifer's school. Throughout the semester, Jennifer kept busy reviewing the students' journals, helping them brainstorm ideas for short-term service activities, and guiding them in reflecting on their experiences. She also helped Mr. Thornton transport the journals to and from the senior center and made needed arrangements for the student's service activities. Jennifer received a lot of support from Dr. Moreno, who frequently observed her at the middle school and met with her and Mr. Thornton to monitor the implementation and progress of the service learning project.

Jennifer learned a lot from her experience in Mr. Thornton's class, especially because she was required to keep a weekly journal in which she reflected on school, community, service, and the teaching/learning process. The culminating assignment for the practicum was to write a short paper about the pros and cons of service learning for K-12 schools. Jennifer received an "A" on her paper, though she had difficulty coming up with many cons based on her positive practicum experience. Jennifer's learning in the course was also assessed through the development of a "service learning action plan" in which she synthesized her knowledge of effective service learning principles into a plan for a project that could be carried out with school-age youth. Program improvement for the practicum was fostered by meetings between CSU faculty and practicum teachers to review the year's activities and plan for the upcoming year.

Learning about "Others": The Human Relations Course and Community Internship

Jennifer's schedule for the next semester included the required Human Relations course and a concurrent community internship. Jennifer had heard from other students that the internship took place in a community agency setting and that it was "hit or miss" as to whether you ended up in a "good" or "bad" placement. Jennifer wished that she could choose her own agency, but the professor, Dr. Hyatt, insisted that with so many students and varied schedules, she would just match students to available agencies as best she could. Although Dr. Hyatt did ask for students' first and second choices from a list of about 25 community agencies, she maintained that the most important aspect of the community internship was that each student work with people who were different from them in some significant way. This statement made Jennifer nervous: having grown up in a small rural town (and planning to return there after graduation to teach), she wasn't sure if she wanted to work with Latino or African-American children and doubted whether she needed this "multicultural" experience.

The following week, Jennifer received her assignment: working with children at the homeless shelter Mondays from 3-5 p.m. When Jennifer tried to ask Dr. Hyatt what the children there were like, she was told just to "go there with an open mind." Dr. Hyatt also said that, given the time limits of the course and all that had to be covered in the syllabus about different cultural groups, "we won't be spending much time on orientation or reflection on your experience." Jennifer quickly realized she was on her own.

When she arrived the following Monday at the homeless shelter, Jennifer was relieved to find that Dr. Hyatt had sent her name to the director, who was expecting her. Jennifer was welcomed and then quickly put to work supervising an after-school play group of eight children aged 8-12—five boys and three girls, a mix of Caucasians and children of color. After 2 hours, Jennifer was tired from her efforts at keeping them all busy and trying to resolve their disputes over the limited art materials, games, and books in the room. On her way home, she made a mental note to pick up some books from the curriculum lab before her next visit.

The following Monday Jennifer was again assigned to work with the after-school group, though some children were gone and others were new. As it turned out, the play group was her responsibility for the semester. Jennifer had many questions from her experience: Why did children come and go? Where were their parents? What else went on at the shelter? Were there certain skills she should be helping the children with? Fortunately, Jennifer had opportunities on two occasions to ask the shelter director questions. She was also able to make some connections between her experience at the shelter and Dr. Hyatt's course readings and lectures about different cultural groups. Unlike the previous semester, Jennifer didn't have to write a paper or even journal about her experience, but the students did talk about their community internships on two occasions in the Human Relations course. Although she enjoyed many of the children with whom she worked, Jennifer ended the community internship feeling frustrated, wishing that she could have reflected on her learning more.

Just Do It! Service Learning in Student Teaching

When the director of student teaching explained that student teachers had the option of completing a service learning project, Jennifer knew she wanted to try it. Reflecting on her experience in Mr. Thornton's class and the excitement she saw among the middle schoolers, she hoped to set up some kind of intergenerational activity. Jennifer's cooperating teacher, Mrs. Dougherty, was less enthusiastic than Jennifer, given her unfamiliarity with service learning, but willing to let Jennifer plan and carry out a project in her sixth-grade class. The curriculum for the semester in the science/social studies class was focused on the environment, and Jennifer quietly puzzled over how to connect the environment with the elderly.

When Jennifer and Mrs. Dougherty attended a CSU workshop to learn more about the service learning in student teaching option, they were given curriculum materials with service learning project ideas—one of which described environmental projects, including how to have students construct a small walking trail through a natural area. When Mrs. Dougherty mentioned that there was an undeveloped local park area a few blocks from the school and adjacent to a nursing home, Jennifer was excited. After talking with the students, the nursing home activity director, and the Parks and Recreation Department, she and Mrs. Dougherty worked out a tentative plan to have the students build a nature trail that seniors (as well as the students and other community members) could use.

However, as the semester proceeded, Jennifer's enthusiasm for the project began to wane. The project was complicated, maybe too big for one semester. All the details made her head spin: clear a trail, construct weather-resistant signs, organize the students' hands-on trail-building work, and coordinate the learning and reflection components in the classroom. Fortunately, Mrs. Dougherty suggested that they enlist help from parents and individuals in the Parks and Recreation Department. With more adult help, the land was cleared and students' outside work was well supervised. The funds provided by the CSU program were used to buy sign-making materials. One of the work days had to be cancelled due to rain, but generally the timeline was followed. Jennifer didn't feel that she did the best job with reflection and assessment, but she remembered Dr. Moreno saying that it was understandable if you couldn't put every element of best practice into place your first time around. At the end of Jennifer's student teaching assignment, the class and the community members who had been involved held a celebration that included a trail-walk and refreshments. The local newspaper even sent a reporter to take photos and do a story on the project. Jennifer was elated and exhausted, and resolved to try a smaller project as a beginning teacher.

Learning from Experience: The Service Learning Conference

The capstone experience in the CSU teacher education program was a service learning conference, where graduating students were invited to give presentations about their experiences. Each student was encouraged to develop a portfolio documenting their service and learning in the Strategies of Teaching course and practicum, the Human Relations course and community internship, and, if they had completed one, the student teaching project. Jennifer had been taking photos and saving journals for her portfolio throughout these experiences. Now it was time to put it all together, to reflect on what she had learned from her experience, and to decide what to share with the conference attendees—CSU students as well as community members and school teachers who had been involved in the projects. An important part of the presentation was to discuss whether and how you would incorporate service learning as a beginning teacher.

Jennifer spent considerable time putting together her portfolio and preparing her presentation. Using the ASLER (1993) standards (the program features listed in the service learning definition at the beginning of this paper), Jennifer analyzed the quality of her service learning experiences. The final page of her portfolio listed six ways that intergenerational service learning might enhance the middle school curriculum. As she had only 20 minutes to speak, she decided to focus on the intergenerational aspects of her experiences. Not wanting to omit her community internship entirely, she suggested that the homeless shelter could benefit from senior volunteers.

After the conference, Jennifer and the other CSU students attended a group reflection session facilitated by Dr. Moreno during which they shared journal entries and participated in small- and large-group activities. The discussions explored insights gained as a result of their service experiences and conference presentations; policy dimensions and ethical issues highlighted by these experiences; possibilities and procedures for creating collaborative partnerships among schools, businesses, and youth-serving agencies; and questions about the role of the schools and of individual teachers in relation to societal issues raised by participation in the community service learning settings.

Issues and Recommendations for the Effective Practice of Service Learning in Teacher Education

The strengths and weaknesses of the hypothetical teacher education program just described illustrate several issues relevant to the effective practice of service learning in preservice teacher education.

There were many strengths in this program. In general, CSU's service learning components provided the teacher education students with a variety of service learning experiences. Jennifer had very positive experiences with the practicum and the service learning conference. These components focused extensively on students' reflection and learning from their service activities, and the goals and outcomes of these experiences were clearly linked with Jennifer's future use of service learning in her teaching. Although she undertook a challenging and at times difficult student teaching project, this experience in the end also proved rewarding. The service learning conference helped Jennifer reflect on her student teaching project and how she might change it in the future.

The community internship, however, was not as successful. Several shortcomings led to this being a less positive experience. First, because the professor did not provide clear goals for learning and service, Jennifer (and probably other students as well) was unsure why she was doing the community internship, how it connected to the goals of the course, and how the knowledge gained would be useful in her future teaching. The lack of reflection and learning related to the internship inhibited Jennifer from making the most of her experience in terms of learning about cultural differences, the issue of homelessness, and the challenges involved in meeting the needs of all students. Although Jennifer did her best to ask questions at the shelter and participated in the discussion in Human Relations class, she needed more guidance to make these connections. If Dr. Hyatt had coordinated her Human Relations course readings, lectures, and assignments with the experiences her preservice teachers were having with culturally different students during the internship, both the course and the students' learning would have been enhanced. Structured learning/reflection would have helped Jennifer during and after the service learning conference in making stronger connections between her internship experience and the social and political realities that create the need for service. Were Jennifer's assumptions and stereotypes about homelessness or children of color challenged? Although Jennifer's discussions in class and at the shelter may have prompted her to reconsider these views, this challenge should have been an explicit focus for Jennifer's Human Relations course experience, identified by Dr. Hyatt in the beginning and then guided by her during the course.

Recommendations

It is not easy to create high-quality service learning experiences in preservice teacher education. Coordinating the logistics of involving students in the community, structuring effective reflection activities and assignments consistent with course goals, and finding the time to plan and coordinate projects with various community agencies are just a few of the challenges that face ambitious professors.

Following are seven recommendations to assist teacher educators in developing high-quality service learning experiences in teacher education. These recommendations emanate both from the research findings and from the day-to-day practice of teacher educators in service learning programs around the country.

Recommendation 1: Preservice teachers should learn about both the theory and the practice of service learning.

It is unlikely that preservice teachers can learn enough about service learning to feel confident implementing it in their future teaching without some practical experiences conducting service learning activities with youth in school and/or community settings. At the same time, placing the study and practice of service learning within the broad theoretical frameworks of experiential education and youth development makes the purposes and impact of service more readily understood (Scales and Koppelman 1997). Given that service learning is a relatively new practice in schools, it is also important that teacher educators incorporate a focus on the day-to-day issues and challenges faced by school teachers as they implement service learning projects.

Recommendation 2: Preservice teachers should be involved in multiple and varied service learning opportunities, and their service learning experiences should model accepted principles for effective practice.

If teacher educators intend to have service learning experiences make a significant impact on preservice teachers, they must provide in-depth and varied service learning opportunities for the prospective teachers. For example, an exemplary program will integrate service learning in at least one required course, as well as provide practical experience in school and/or community settings. The teacher education program described in the case study represented an effective model for this variety and depth, including course assignments, projects, and reflection activities; practica and internships in the community or schools; and conferences. Each added experience offers preservice teachers another chance to develop their knowledge and appreciation of service learning, whereas one-shot or short-term experiences are less likely to be effective in developing their commitment to service learning.

It is also important that the service learning experiences provided to preservice teachers provide them with a model for effective practice. The ASLER (1993) definition of service learning presented at the beginning of this paper suggests standards for precollegiate service learning. To ensure that preservice teachers' own service learning experiences model the same effective practice they will apply in their future teaching, teacher educators should apply these same standards in planning, implementing, and evaluating their preservice teacher education programs:

- Are the service learning experiences that teacher education students engage in thoughtfully organized?
- Do they meet community needs?
- Are they integrated into the teacher education curriculum?
- Is time provided for reflection?
- Are the students applying skills they have developed in courses and practica to their service learning activities?
- Are the students encouraged to connect their service learning experience with their future profession?
- Are the students developing caring and compassion as a result of serving others?

Without affirmative answers to these questions, it is doubtful that the teacher education program will enable preservice teachers to implement what we currently know about the best practice of service learning.

Recommendation 3: Preservice teachers' service learning experiences should be aligned with specific goals and outcomes in the teacher education program, and they should have opportunities to make significant decisions about those experiences.

As with any course assignment or practicum experience, service learning activities must be carefully matched with specific goals and desired outcomes in the teacher education program. For example, if the goal is to have preservice teachers use service learning as a teaching strategy in their future classrooms, it is important that they experience assisting with or conducting service learning projects in classroom settings. If the desired outcome is developing an understanding of cultural differences, they should have an opportunity to collaborate on service learning activities with individuals from backgrounds different than their own. Other teacher education program goals that can be addressed through carefully planned service learning activities include developing reflective practitioners; fostering an understanding of the role of the teacher as community liaison and moral guide; building students' repertoire of authentic teaching and learning strategies; and developing students' knowledge of specific course content.

Having said that, it is also important for preservice teachers to play a major role in making choices about their own goals and the service learning experiences they undertake to meet those goals. For example, teacher education students might choose the social issue they want to address as a focus for a service learning project, or select a particular youth-serving agency in the community with which to become involved. Such choices enhance personal empowerment, which in turn enhances what they gain from their their service learning experiences.

Preservice teachers should also have substantial input into the design of the service learning components offered through their teacher education program. To the extent that preservice teachers experience personal empowerment firsthand in co-creating service learning experiences, they will be more likely to invite the participation of children, community agencies, and service recipients in the design of their future service learning activities.

Recommendation 4: Preservice teachers should be encouraged to reflect critically on the conditions of society that create the need for "service" and to examine issues of power, oppression, and social injustice.

Several research studies on preservice teachers' service learning experiences with culturally different others suggest that, although teacher education students often enhance their awareness and acceptance of others, they seldom question the prevailing norms and societal conditions that have led to the need for service in the first place. Nor do teacher educators often ask their students to examine difficult aspects of service learning such as, how does a person from the "dominant" culture "serve" someone from a "marginalized" culture from a position of solidarity rather than charity?

Teacher education students should also explore the tension between individualism and community-mindedness in our society as it relates to service. Shifting the balance away from privatism and toward a commitment to the common good requires that we address the root causes of greed and narcissism and the political, social, environmental, and economic issues that plague our society. Although teacher education students who are engaged in advocacy service learning projects (e.g., petitions, campaigns, lobbying) are the most likely to examine these issues, students who are engaged in one-to-one direct service should also be encouraged to ask difficult questions and consider the "big picture" behind their service learning experiences.

Recommendation 5: Preservice teachers should develop skills in conducting reflection and assessment activities related to their service learning experiences, and teacher educators should model reflective practice by evaluating and researching the service learning components of their own programs.

A nationwide study of beginning teachers' experiences with service learning revealed that reflection and assessment are getting little attention in otherwise good projects (Wade et al. 1998). Preservice teachers will therefore benefit from additional attention to these aspects of service learning in their college studies. Teacher education students can learn and practice various forms of reflection—journal writing, discussion, writing assignments, displays, presentations—within the context of reflecting on their own service learning experiences. Instruction on assessment should include authentic forms of assessment as well as strategies for using traditional measures such as teacher-designed questionnaires, tests, and essays to evaluate specific desired outcomes of service learning activities.

Preservice teachers can also learn about the value of reflection and assessment when they see teacher educators evaluate and research the service learning components of their programs. Teacher educators nationwide have developed a variety of tools for evaluating their programs including interview questions, surveys, and portfolio guidelines. Data gathered using these assessment and research tools provides important feedback from teacher education students that can be used to modify programs and to further develop the knowledge base on service learning in teacher education. Teacher educators can use these data to reflect on their own practice and the ways in which they choose to organize service learning activities in their programs. Through this process, they are both modeling effective practice and improving the quality of service learning training for their preservice teachers.

Recommendation 6: Teacher educators should collaborate with others to build a "culture of service" in teacher education, K-12 schools, community organizations, and society at large.

Finding the time to collaborate with community agencies, K-12 schools, and service recipients in order to develop positive service learning experiences in teacher education programs is a major task for busy professors, and the potential burden keeps some teachers from implementing service learning. In recognition of this challenge, many colleges and universities are hiring campus-wide service learning coordinators to assist professors from many disciplines in linking with the community and evaluating the outcomes of experiential learning. Teacher educators without this support, however, must not be daunted, but rather seek out like-minded individuals in the schools and community who will be willing to share the effort of organizing a high-quality program. Only when we have together built a "culture of service" in our schools and communities will more teachers choose to implement service learning activities in their curricula.

Recommendation 7: Teacher educators should make connections between service learning and other compatible school reform efforts.

Many school districts are engaged in multiple school improvement initiatives. Teachers are often overwhelmed with inservice workshops on a variety of such initiatives, and those that are perceived to be short-lived "fads" are only minimally implemented in classrooms. Teacher educators should help preservice and inservice teachers see that, rather than service learning being another fad competing for their time, the goals and outcomes of service learning are consistent with many other school reform efforts such as school-to-work, performance-based assessment, character education, higher-order thinking skills, democratic education, multicultural education, problem-based learning, and cooperative learning. In seeing the connections between service learning and other school initiatives, both preservice and inservice teachers will realize the value of service learning and put greater effort into thoughtful implementation of service learning in their classrooms.

Future Directions for Service Learning in Preservice Teacher Education

The examination of service learning—the research to date, the state of the art, model practices, and recommendations for developing quality programs—leads finally to the question of future directions for service learning in teacher education. In some ways, the ideas offered as recommendations can also be seen as challenges for the future. Certainly, the collective efforts of teacher educators involved in service learning must be aimed at providing high-quality experiences with input from preservice teachers, collaborating with others in our schools and communities to build a societal "culture of service," connecting service learning with supportive school reform efforts, and challenging preservice teachers to develop skills in reflection and assessment and to question the power relations and social injustices in society.

Perhaps the more critical question, then, is not "What do we need to do?" but rather "How do we get there from here?" Efforts are needed in establishing service learning as an essential practice, pursuing a systematic research agenda, and generating funding. The tasks laid forth here will not be accomplished quickly or by single individuals. Only through collective efforts mounted on many fronts will service learning become an accepted and important part of education at both the preservice and K-12 levels.

Service Learning as an Essential Practice

Efforts to enhance the development of service learning in teacher education cannot exist apart from fostering service learning as an essential practice in the nation's K-12 classrooms. Even with effective training and multiple experiences in service learning in their teacher education programs, beginning teachers who secure jobs in schools that are not supportive of school-community collaboration and experiential learning will often choose not to implement service learning (Wade et al. 1998). Many teacher educators committed to service learning thus recognize the importance of providing inservice training for experienced teachers in addition to coordinating service learning experiences for preservice teachers.

> "Efforts to enhance the development of service learning in teacher education cannot exist apart from fostering service learning as an essential practice in the nation's K-12 classrooms."

It goes without saying that the quality of service learning experiences in teacher education depends largely on teacher educators' knowledge and understanding of service learning. Efforts to enhance teacher educators' knowledge of effective means for accomplishing these dual tasks will be aided through the development of supportive networks and a body of published research studies and curriculum materials. Networks of teacher educators involved in service learning are presently being coordinated by the National Partnership for Service Learning in Teacher Education (a Corporation for National Service funded project), the American Association of Colleges of Teacher Education, and the Council of Independent Colleges, among others. Through electronic listservs, conferences, institutes, and special interest groups, these organizations are linking teacher educators interested in service learning and providing needed technical assistance for developing high-quality service learning experiences in teacher education.

Research and Evaluation

As was apparent in the research reviews presented earlier, more research is needed both on the effects of service learning on precollegiate students and on teacher education students. Many teacher educators committed to service learning realize the importance of extensive research and evaluation of teacher education students' experiences and their subsequent involvement with service learning as beginning and experienced teachers. Coordinated efforts to develop a systematic research agenda on service learning in teacher education have been started by the groups cited above and others. The future of service learning in teacher education rests in part on researchers' abilities to demonstrate the effectiveness of service learning practice in both teacher education programs and K-12 schools.

Funding

Many teacher education programs have benefited from the financial support of federal or private grant initiatives for service learning in higher education. Grants provided by the Corporation for National Service, the Fund for the Improvement of Postsecondary Education, and others have provided essential start-up funds for campus-based programs and state and national collaborations. However, it will be important in the coming years to demonstrate that service learning in teacher education can be sustained and institutionalized by learning institutions and communities without relying on federal support. At the same time, teacher educators committed to service learning should continue to generate interest among private and public funders for supporting research and program development and to work on the federal, state, and local levels to advocate for policies that will support the continuation of service learning programs.

Conclusion

Service learning in teacher education is a relatively new phenomenon; at present there are few "experts" yet much interest in learning more about effective ways to involve preservice teachers and their future students in working with others to build better communities. Both research efforts and model programs, although in their beginning stages, show promising benefits resulting from well-done service learning experiences. Teacher educators working hand in hand with each other, their students, local schools, and community partners are slowly developing the knowledge and skills needed to promote service learning as a viable component of K-12 education and teacher education in our multicultural society. As one effective means for contextual teaching and learning, service learning has the potential to link campus and community, to motivate students through meaningful activity, and to reignite a commitment among our nation's youth to civic participation and social justice.

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Annotated List of Selected Works on Service Learning in Teacher Education

Erickson, J. A., and Anderson, J. B. (Eds.) (1997). ***Learning with the community: Concepts and models for service learning in teacher education***. Washington, DC: American Association for Higher Education. (ERIC Document Reproduction Service No. ED 416 179)

In this comprehensive book on service learning in teacher education, leading practitioners and scholars in the field of service learning and teacher education explore theoretical and empirical support for the use of service learning as an educational strategy. Connections are made between service learning and educational reform efforts, and practical issues such as collaborating with the community, evaluation, and finding time in the curriculum for service are addressed. A highlight of the monograph is the inclusion of descriptions of how service learning has been integrated into teacher education programs at 14 colleges and universities throughout the country.

Gomez, B. (Ed.). (1995). ***Integrating service learning into teacher education: Why and how?*** Washington DC: Council of Chief State School Officers.

The first section of this monograph makes a case for service learning by describing how service learning processes contribute to various learner outcomes. Most of the monograph focuses on providing detailed descriptions of the service learning components of six teacher education programs.

Root, S. C. (1994). "Service learning in teacher education: A third rationale." ***Michigan Journal of Community Service Learning***, 1, 94-97.

Root's article provides a thorough analysis of the many reasons service learning is an important focus for teacher education programs. Service learning is presented as a tool to encourage reflective practice, assist with effectively teaching all students in our diverse society, and enhance preservice teachers' vision of themselves as moral leaders and liaisons with the community.

Scales, P. C., and Koppelman, D. J. (1997). "Service learning in teacher preparation." In Schine, J. (Ed.), ***Service learning*** (pp. 118-135). Chicago, IL: National Society for the Study of Education.

This chapter analyzes the current state of service learning in teacher education. Several examples of programs are offered, and issues related to the goals of service learning, its fit within the philosophy of youth development, operational needs and barriers in service learning programs, and realizing the potential of collaboration are discussed. The chapter concludes with a set of recommendations for inservice and preservice training.

Wade, R. C. (1997). "Service learning in preservice teacher education." In R.C. Wade (Ed.), ***Community service learning: A guide to including service in the public school curriculum*** (pp. 314-330). Albany: State University of New York Press.

This chapter explores the different elements of program design for service learning in teacher education and highlights the decisions teacher educators must make in developing service learning courses and practica. Descriptions of service learning in seven teacher education programs serve to highlight the different types of options available.

Wade, R. C., and Yarbrough, D. B. (1997). "Community service learning in student teaching: Toward the development of an active citizenry." ***Michigan Journal of Community Service Learning***, 4, 42-55.

This research study presents both qualitative and quantitative data on student teachers' service learning experiences. Findings reveal numerous positive outcomes for student teachers, cooperating teachers, and youth. Discussion addresses the role of service learning in fostering student teachers' development and self-empowerment. Challenges within service learning practice and the cooperating/student teacher relationship are also addressed.

Preparing Preservice Teacher Education Students to Use Work-based Strategies to Improve Instruction

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Colleges and universities that actually use work-based learning strategies to prepare *preservice* teacher education students for teaching careers in K-12 public and private school environments are few. This is especially true in programs that prepare teachers primarily in the traditional content areas of mathematics, science, language arts, foreign languages, social studies, and elementary education. Institutions that offer vocational and technical education and teacher preparation programs for learning environments other than K-12 (for example, adult education, higher education, recreation and leisure, health promotion and education, the fine arts) are more apt to include work-based learning strategies as an integral part of their preservice program. But little information is available, at a macro level, about broad-based integration of work-based strategies in preservice teacher education programs; most evidence comes from program-specific sources such as course descriptions in university catalogs, meager response from a national e-mail solicitation on the subject, and presentations given at various workshops and conferences.

It is our contention that colleges and universities should include work-based learning strategies as an integral part of the teacher preparation curriculum and pedagogy. Teachers must be prepared to show connections between subject matter and the workplace and to teach their students to apply knowledge at work and in other nonschool environments. The reasons for doing so are grounded in the underlying principles of education and what people expect from public schools; the necessity to prepare all people for productive and meaningful employment; and a compelling body of knowledge from the cognitive sciences which shows that students learn more and better when content is situated in real-world contexts.

This paper describes work-based learning as a concept and an educational approach as it has developed through a continuing partnership with public education; business and other work communities; and local, state, and national government. It explores why work-based teaching and learning strategies are becoming increasingly important, provides insights into the skills and knowledge needed by teachers to implement these strategies, and demonstrates the relationships of these strategies to situated learning theory. Finally, it discusses how professional development programs using work-based learning approaches are preparing teachers for new roles and the implications of these efforts for the redesign of preservice teacher education programs.

What Is Work-Based Learning?

In the most general sense, work-based learning is a form of learning that provides students with exposure to environments outside of the school setting to assist them in making connections between what they are learning in school and how it is used in real-life work activities. The concept and definition of work-based learning continues to evolve as school reform efforts and new federal initiatives address the need to connect schooling and work in preparing all students for future work roles.

Work-based education is not new in the United States. It has its origins in the Colonists' apprenticeship programs, which included a mix of full-time work, on-the-job training, and additional instruction in theory. In the late 1800s, cooperative education programs were established in public high schools to keep young people in school and prepare them for work. In the early 1900s engineering colleges used work-based education to coordinate schooling in academic settings with outside practical experience in the workplace. Work-based learning received support in educational reform legislation, including the Morrill Act (1862) and the Smith Hughes Act (1917), which established funding for public vocational education institutions and programs. Professional education programs preparing practitioners in medicine, law, architecture, and engineering traditionally have required a combination of school and guided work or practical experience. Teacher education programs typically use practice teaching experiences in work settings (that is, in schools) as part of professional preparation for teaching roles.

Contemporary work-based learning is grounded in teaching and learning research emanating from the cognitive sciences, psychology, and pedagogy. Consistent with the research of these various disciplines, work-based learning blends into an integrated curriculum the mental and tactile, theoretical and applied, and academic and vocational. This blending appears—for most students most of the time—to result in increased retention of knowledge, deeper understanding of subject matter, and the ability to apply (i.e., transfer) knowledge and skills in ill-structured environments. The effectiveness of blended classroom- and work-based activities also draws strength from the psychological and pedagogical principles underlying constructivism, contextual learning, the teaching of concepts and subjects through a variety of methods based on students' preferred learning styles, and authentic assessment. Much of what we know about what makes work-based learning effective has been learned through research on learning and training in workplaces.

The most recent federal legislation to expand work-based learning in public education, the School-to-Work Opportunities Act (STWOA) of 1994, identifies work-based learning as one of three basic components of school-to-career transition and describes it as "a planned program of job training and work experiences (including training related to preemployment and employment skills to be mastered at progressively higher levels)" that is coordinated with school-based learning through connecting activities such as counseling and business-education partnerships. The legislation specifies that the work experience should involve "workplace mentoring; instruction in general workplace competencies, including instruction and activities related to developing positive work attitudes, and employability and participative skills; and broad instruction in all aspects of the industry" (STWOA 1994, sec. 103a). The U.S. Office of Technology Assessment (1995) describes work-based learning as "learning that results from work experience that is planned to contribute to the intellectual and career development of students" (p. 3). It may take place in a workplace or surrogate workplace, is planned at least partly to improve students' career orientation and occupational development, and is reinforced by activities in the classroom that apply or extend the learning so that students develop attitudes, knowledge, skills, and habits that might not result from work experience alone. Hamilton and Hamilton (1997b) specify that in order to be work based, learning must be intentional and experiential and must occur in locations where the primary activity is producing goods or services. It is a means of increasing students' engagement in learning and preparing them for employment. Work-based learning activities can begin as early as the first grade and extend through graduate school.

Each of these descriptions contributes to an evolving understanding of what work-based learning is or what it should be. In an attempt to pull together these disparate elements, we offer the following comprehensive, operational definition of work-based learning for the purpose of discussion in this paper:

> Work-based learning is an educational approach that uses workplaces to structure learning experiences that contribute to the intellectual, social, academic, and career development of students and supplements these with school activities that apply, reinforce, refine, or extend the learning that occurs at a work site. By so doing, students develop attitudes, knowledge, skills, insights, habits, and associations from both work and school experiences and are able to connect learning with real-life work activities. (adapted from Office of Technology Assessment 1995)

Forms of Work-Based Learning

Work-based learning can include a continuum of experiences that vary in purpose, the type of activities engaged in, the nature of the connection with schools, and the investment of time, money, and other resources required of learners, teachers, and employers. The activities may range from visits to workplaces and simulated work-like experiences to actual paid employment. Experiences at the beginning of the continuum are for the purpose of career awareness and exploration of career options; they may occur as early as elementary school. These early career awareness experiences might include making class field visits to job sites, inviting speakers from business and industry to the school, planning and operating a business at the school, and conducting other age-appropriate activities to begin developing connections between what happens in school and what happens in the community and work settings outside of school. Later experiences build on early exploration and information gathering by providing opportunities to learn more about the work culture and expectations that business and industry have for employees. Still later, work-based learning options can provide more structured opportunities for students to learn knowledge, skills, and attitudes associated with a broad range of career fields or focused on a particular industry.

Hamilton and Hamilton (1997a) identified eight types of work-based learning activities typically available for students in K-12 public education:

- **Field trips:** One-time visits to observe work sites.
- **Job shadowing:** Longer term activities, including multiple visits to observe a worker onsite.
- **Service learning and unpaid internships:** Voluntary activities that may or may not have a direct career focus.
- **Youth-run or school-sponsored enterprises:** Workplaces created in or by schools to provide experience producing and marketing goods or services.
- **Youth jobs:** Jobs typically open to teenagers, which may not offer structured learning opportunities.
- **Subsidized employment training:** Part of a training program supported by federal or state funds.
- **Cooperative education and paid internships:** School-related, paid work experience.
- **Apprenticeships:** Long-term, structured work-learning programs leading to certification.

In addition to these types of work-based learning, **clinical internships and practica,** occurring more frequently at the postsecondary level, provide school-related, unpaid work experiences in preparation for certain professional fields of education.

Several broad-based, systemic reform initiatives have been introduced in the past decade to extend work-based learning activities to more students in more schools nationwide. Among the major federal, state, and locally funded programs supporting expansion of work-based learning as part of the educational experience are tech prep, youth apprenticeships, school-to-work opportunities, and cooperative education. Within each of these initiatives, various approaches to work-based learning have been developed and implemented in the schools. The primary approaches to work-based learning used in U.S. education today include cooperative education, clinical experience, internship or practicum, youth apprenticeship, school-to-apprenticeship, school-based enterprise, career academy, community service, and a variety of career awareness and exploration programs and activities designed for elementary and middle school youth. Each of these forms of work-based learning is summarized in the appendix to this chapter.

Characteristics of Work-Based Learning

From their national study of high-quality work-based learning programs, Goldberger, Kazis, and O'Flanagan (1994) have identified 10 basic design elements for worksite learning:

- **Goals:** Partners formally agree on the goals of the work-based program and how to achieve them. This includes identifying benefits for both students and employer partners as well as resources, roles, and responsibilities required of each.
- **Plan:** Student learning at the workplace progresses according to a structured plan. This includes development of written individual learning plans that state learning objectives and activities and methods of assessment.
- **Transferable skills:** Work-based experiences promote the development of broad, transferable skills. This means that students learn the social aspects of work processes (e.g., teamwork, time management, communication), develop higher-order thinking and problem-solving skills, and are exposed to all aspects of the industry through job rotations, job shadowing, and onsite work mentors.
- **School-based activities:** School-based activities help students distill and deepen lessons of work experience. Included here are use of student projects, journal writing, and other customized assignments to explore work-related issues, and academic classes that are organized around work-related themes and applications.
- **Documentation and assessment:** Student learning at the worksite is documented and assessed. This means that students can demonstrate mastery through authentic, relevant tasks and alternative assessments such as portfolios of student work and performance-based evaluation by worksite experts.
- **Preparation for workplace entry:** The program prepares students to enter the workplace. This includes orientation by the school or classroom instructor on basic job-related skills and behaviors expected by employers to strengthen student work readiness.

- **Student support:** Students receive ongoing support and counseling. This support can be in the form of formal and informal mentoring by adults in the workplace as well as teacher and counselor monitoring, coaching, and coordination from the school.
- **Staff support:** The program provides orientation, training, and ongoing support to worksite and school staff. This support can include formal orientation sessions or materials for employers, ongoing meetings, training in pedagogy, and internships or job shadowing in work settings for teachers.
- **Administrative support:** Administrative structures are established to coordinate and manage the worksite component. This includes designating both a school-based and a worksite-based coordinator for work-based learning to organize and evaluate activities.
- **Quality assurance:** Mechanisms exist to ensure the quality of students' work-based learning experiences. These include regular review and feedback by participants and external evaluators.

The Quality Work-Centered Learning Network of Jobs for the Future has begun to identify the dimensions of work-based learning that can be used to establish quality standards for work-based learning experiences developed by schools (Steinberg 1998). The quality control factors included in the following initial list underscore the purposes of work-based learning and highlight some of its benefits to students (pp. 102-103):

- Experiences are structured around learning goals, agreed to by students, teachers, and outside partners, that assist students in reaching standards and graduation requirements.
- Students carry out projects that are grounded in real-world problems, take effort and persistence over time, and result in the creation of something that matters to them and has an external audience.
- Students receive ongoing coaching and expert advice on projects and other work tasks from employers and community partners; by learning to use strategies and tools that mirror those used by experts in the field, students develop a sense of what is involved in accomplished adult performance and begin to internalize a set of real-world standards.
- Students develop a greater awareness of career opportunities in the field and deepen their understanding of the educational requirements of these careers.
- Students develop their ability to use disciplinary methods of inquiry (e.g., think like a scientist) and enhance their ability to

tackle complex questions and carry out independent investigations.

- Students are able to demonstrate their achievements through multiple assessments, including self-assessment, specific performance assessments (e.g., oral proficiency exam), and exhibitions.

Benefits of Work-Based Learning

The literature on work-based learning identifies a number of potential benefits accruing to students, employers, and educational institutions from the incorporation of work-based learning teaching and learning strategies into the schools. Many of these are based on reports of practitioners and participants and have not yet been thoroughly validated by evidence from research and evaluation studies (Lynch 1996, p. 7).

Benefits to Students. Students who take part in work-based learning experiences benefit because work-based learning—

- provides realistic learning experiences that help students develop career interests and abilities and acquire employability skills;
- provides a smoother transition from school to employment through the development of relevant career and employability skills;
- enables students to develop maturity by strengthening resourcefulness, problem-solving skills, self-confidence, self-discipline, and responsibility;
- enables students to develop human relations skills through personal interaction with employers, customers, and others;
- strengthens academic learning, application, and retention by combining work exploration or experience with classroom/laboratory theory and training;
- provides financial benefits (with the exception of those work-based learning experiences that are nonpaid and focus on career awareness and exploration);
- provides academic credit toward a high school diploma, one- or two-year postsecondary certificate, or associate degree;
- provides educational guidance, counseling, and supervision to match career interests; and
- enhances employment opportunities upon completion.

Benefits to Employers. Employers who participate in work-based learning approaches benefit because work-based learning—

- assists in the recruitment of qualified present and future employees;
- reduces the training period and requirements for those students who continue their employment with the same employer;
- enhances employee productivity;
- creates a partnership between business and education;
- provides an opportunity for community and social involvement; and
- links academic and occupational education with the knowledge and skills needed in the workplace.

Benefits to the Educational Institution. Work-based learning benefits educational institutions by—

- extending academic experiences to the world of work;
- involving employers in determining a student's training plan and program, thereby helping to ensure realistic academic and occupational experiences;
- providing school personnel with access to current business and technological developments, thereby helping to ensure professionally up-to-date and relevant instruction; and
- providing students with the latest equipment and up-to-date training facilities.

Rationales for Work-Based Learning

> Young people know little about work, have no clear idea about what they must do to enter a particular career or occupation, and do not know what might be expected of them at work. They have only the vaguest notions about what skills they need to learn and have no particular incentive to learn those skills—they do not understand how the skills and knowledge they learn in school can benefit them. Meanwhile, schools fail to teach the appropriate attitudes and workplace behavior, and do little to help students achieve the maturity and responsibility they must assume as adult workers. Isolated with their peers both in school and in their youth jobs, young people have little contact with adults other than teachers, and the typical student-teacher relationship bears little similarity to effective relationships on the job. (Bailey 1995, p. 3)

Literature examining the use of work-based learning strategies in education draws upon evidence and arguments from a number of different perspectives: economic and work force development needs, philosophical debates about the purpose of public education, and research on how learning occurs and can be improved.

The Economic View

A great deal has been written recently about how the workplace is changing, the new skills needed by employees to be successful in jobs at all levels, and business and industry concerns about being unable to compete in global marketplaces. In the past decade, a number of high profile national reports have criticized the role of U.S. public education in preparing workers for a changing workplace—see, for example, ***A Nation at Risk*** (National Commission on Excellence in Education 1983), ***What Work Requires of Schools*** (Secretary's Commission on Achieving Necessary Skills 1991), ***America's Choice*** (National Center on Education and the Economy 1990), and ***The Forgotten Half*** (William T. Grant Foundation 1988). Employers are concerned that huge numbers of high school graduates are not being prepared with the knowledge, skills, and attitudes needed in today's changing economy and information age jobs, either entry level or more advanced professional work. Workplace trends such as high performance work systems, customization, total quality, continuous learning and improvement, lean manufacturing, learning organizations, increased use of information technologies at all levels, teamwork, and problem solving and decision making by front-line workers are among the significant changes in workplaces that require new skills of workers.

Business and industry, as "consumers" of education's "product," have a strong interest in the quality and content of schooling because they recognize education's contribution to economic growth and its effect on business and industry's ability to compete effectively in the global economy. Development of voluntary national industry skill standards by industry and professional groups is one federally supported attempt to establish clear expectations about what students need to know and be able to do to succeed in various occupations anywhere in the nation. Education is seen as the foundation of economic development at the local and state levels as well. Competitive economic advantage is linked to the skills of the work force, which makes education and training a high stakes issue for many communities. Businesses are willing to invest in education to get employees with the skills they need, and this in turn creates for individuals expanded opportunities for high-skill, high-wage employment. Education's role has always included preparing students for employment; however, the criticism today is that the school organization, curriculum, and instruction created for an industrial age are inadequate to meet the demands of an information-based society and to provide the knowledge workers need for a changing, "high tech," high performance workplace.

Philosophical Perspectives

Debates about the purpose of education have always been a part of the discussion of education reform. Carnevale and Porro (1994) refer to the three-part mission of education: preparing students for the community role (teaching them to be good neighbors), the political role (preparing them to be informed and involved citizens), and the employment role (enabling them to be qualified workers). The employment role, however, is seen as pivotal for filling the other roles, since so much of our societal and individual identity is based on career choices, work skills, and the ability to be self-supporting. Hamilton (1990) talks about education serving as apprenticeship for adulthood by helping young people make connections between school learning and preparing them for community participation and for satisfying, constructive life work. Because schools tend to isolate youth from adults in work settings, work-based forms of learning provide an important means of exposing students to job options and careers, motivating them to acquire the education needed for successful, career-sustaining employment, and leading to a broad range of occupational and educational ends. Work-based experiences supplement schooling by providing alternative environments for learning and motivating youth to learn more by relating learning to future work roles.

Resnick (1987) also targets the discontinuities between learning in school and other forms of learning. She sees the role of school as one of preparing students for economic participation, job training, and civic and cultural contributions, and of providing skills for continued learning outside of school. Schools fulfill this role by developing students' higher-order cognitive abilities, reflection, and reasoning skills through an education that integrates real-life experiences and applications as a broader preparation for life and work. Hamilton and Hamilton (1997a) point out that learning and working are increasingly intertwined throughout our adult lives. Therefore, all youth need to be prepared to continue learning in both work and educational settings.

The false distinction between college and vocational preparation and the failure to integrate academic and vocational learning are now being challenged through various national and state reform initiatives such as tech prep, school-to-work, and the Southern Regional Education Board's High Schools that Work. "Vocational" education is being redefined from narrow, job-specific preparation for the less academically oriented student to broad-based, work-related learning that is appropriate preparation for all students regardless of when they will enter the work force (Steinberg 1998). Renewed interest in John Dewey's educational philosophy underlies much of this thinking. In the early 1900s Dewey defined vocations as extending beyond paid employment to include participation in family and community activities, the political process, and artistic efforts. His "education through occupations" was intended to help students develop the full range of their capabilities and ultimately find fulfilling lives (Dewey 1916).

Learning Theory

The convergence of business and education goals is being reinforced by the evolving theory and research in the cognitive sciences about how learning occurs in various settings. Findings about how students learn best and transfer knowledge to situations outside of school are reflected in writings on situated cognition and cognitive apprenticeship (Brown, Collins, and Duguid 1989; Collins, Brown, and Holum 1991) and in the work on contextual learning and applied academics. This conceptual framework and its implications for contextual teaching and learning are described by Borko and Putnam in their chapter in this volume. Briefly, these findings suggest that students learn more and retain it longer when they deal with real-world problems and learn knowledge in the context in which it is actually used. Situated cognition emphasizes the cultural and social aspects of knowledge acquisition within a community of practitioners, which is not replicated well in school settings where knowledge is taught as an abstraction. Berryman (1995) sees the cognitive apprenticeship principles as a model for learning that overcomes the current ineffective educational paradigm that is based on passive, fragmented, fact-based, right-answer, noncontextual learning. Drawing on teaching principles used by good academic and vocational teachers and the concepts of situated cognition, cognitive apprenticeship identifies learning strategies, content sequencing, and methods for teaching using the sociology of learning.

In their examination of workplaces as learning environments, Stasz and Kaganoff (1997) examined the social means by which work tasks are established and accomplished by students, the opportunities for learning different skills and attitudes, and how teaching and learning at work occur. Although they found positive indications of student learning, they concluded that, in order to assist students adequately in preparing for their work experience and getting the most from it, teachers must understand the social context of the work-based learning setting. This understanding can also lead to better placements of students in work sites. Stasz and Kaganoff also observed that school does not prepare students for learning as it occurs in the workplace and that it needs to encourage students to be active, engaged learners who can work both alone and with others in teams and who can take more responsibility for their own learning. Bailey and Merritt (1997) argue that the pedagogical approaches used to support school-to-work apply to all learning, not just learning for some (i.e., vocational) students, and that preliminary results show that these approaches can improve learning even for college preparatory students.

As more educators come to understand the value of natural applications from the world of work in teaching the academic curriculum, professional groups such as the National Council of Teachers of Mathematics and the American Association for the Advancement of Science are suggesting that academic program standards should address the inclusion of work-based problem-solving examples in the curriculum (Bailey and Merritt 1997). Others have argued that work-oriented mathematics is more consistent with current innovative approaches to mathematics teaching and can provide strong preparation for college as well (Forman and Steen 1995). Hamilton and Hamilton (1997c) point out that work-based learning experiences alone are not enough to raise students' academic achievement. To do this, a variety of learning options and instructional approaches—both academic and vocational—are needed that make explicit links between knowledge and application.

Effectiveness of Work-Based Teaching/Learning Strategies

Results from early studies examining use of authentic teaching strategies and work-based learning approaches in education provide some positive indication of its impact on student achievement, motivation, and educational continuation.

Phelps (1998) cites preliminary evidence from several programs using work-based strategies (e.g., the General Motors partner program in manufacturing technology, California's career academies) indicating higher grades and class rank and significantly reduced absences among program participants', compared to nonparticipants (Hollenbeck 1996; Stern, Raby, and Dayton 1992).

Participants were just as likely to pursue further education; and for students with disabilities and those at risk, both better earnings and likelihood of pursuing further education were identified outcomes. Perhaps more important, the work-based teaching approaches used in these programs were found to benefit all students, including the college bound.

Student engagement in learning is essential to motivation, retention, and achievement. The success of work-based teaching and learning strategies seems to be in their capacity to engage students in learning by making connections between work and learning, between "real life" and schooling (Steinberg 1998).

Bailey and Merritt (1997) discuss preliminary empirical evidence of researchers who are finding that guided educational experiences outside of the classroom, particularly in the workplace, strengthen and increase the amount of knowledge that is learned, understood, and retained and motivate student interest in continued academic learning. They cite a study by Newmann and Wehlage (1995) of 24 school reforms using authentic teaching strategies, which found increased student achievement and more equitable distribution of achievement within schools. Bailey and Merritt believe that school-to-work approaches, which include a work-based learning component, have potential for all secondary schools in preparing all students for work and college and in teaching academic skills as well as or better than traditional approaches. Similarly, the Office of Technology Assessment (1995) report concludes that studies of early work-based learning models have shown that they "motivated students, pleased employers, and often had small positive effects on grades, graduation rates, and postsecondary enrollments. Their effects on early employment have been more mixed, and their long-term effects on employment and career satisfaction have not been assessed" (p. 70).

It should be noted, however, as Stasz (1997b) points out, that weaknesses in the research designs of many studies limit the conclusions that can be reached about outcomes of work-based learning. For example, comparison groups of nonparticipants often are missing or not matched on important characteristics (such as initiative, motivation, or school attitudes) that can affect outcomes, so that it is sometimes unclear whether the reported outcomes are due to work-based learning or other factors.

Stern (1997) notes that much of the evidence of the impact of work-based learning relies on reports by participants about what they are learning. Although studies using direct observation, interviews, and questionnaires to collect information on programs have found positive evidence, comparison with nonparticipants is often lacking. His conclusion is that recent findings are encouraging but incomplete. Stasz (1997) asserts that much more information is needed about work-based learning, including—

- Processes of learning in work versus school settings
- Social and cultural aspects of workplaces
- How school-based teaching should be improved to prepare students for work
- The quality of teaching/mentoring at work sites
- How to connect school and work-based learning
- What program outcomes may be related to size or focus
- The broader implications of work-based learning for youth development beyond economic outcomes

Implications for Preservice Teacher Education

What is the most effective way to engage future teachers in gaining the knowledge and understanding that will inform their choices as a school-based teacher in a work-based learning system? The situated learning answer is to engage the preservice teacher in authentic activity and provide the structure to support their learning efforts. In preservice programs, prospective teachers should participate as observers or interns in work sites where high-level technical competence is being developed and used along with the generic skills and attitudes that underlie these work tasks. This exposure can provide some of the social insights that are so essential to the conceptualization, design, and implementation of work-based learning approaches in the curriculum.

Information about current efforts to use work-based approaches in the preservice education of teachers—other than what we know about student teaching, Professional Development Schools, and the inclusion of work-based teaching/learning topics and strategies in the preservice curriculum—is scarce. Few university teacher education programs appear to be incorporating these approaches into the curriculum in any significant way. One in-progress study by the Mid-Continent Regional Educational Laboratory (1997), which is looking at how institutions prepare teachers to participate in school-to-work systems at the preservice level, reports preliminary (unpublished) findings from a survey of teacher education programs in a 10-state region of the United States. Based on responses by 124 institutions offering graduate and undergraduate teacher education programs, they conclude:

> There is limited awareness, understanding and acceptance of [School-to-Work] concepts among institutions of higher education in the 10 state MRT III region (IL, IN, MI, MN, OH, WI, IA, KS, MO, NE). Institutions rely on traditional preservice educational strategies and experiences; few curricular efforts involve businesses or focus explicitly on STW. These programs prepare teachers well for school-based learning but are apparently less effective in preparing teachers for work-based learning and connecting activities. Although many institutions are beginning to explore the implications of STW for their teacher preparation programs, most have no clear plans for addressing STW at this time. (p. 8)

Given the limited information available on working models of work-based learning in preservice teacher education programs, the experience of professional developers who have designed activities for practicing teachers provides an emerging knowledge base about how to prepare teachers to use work-based learning strategies. Several authors have recently studied public school staff development and training programs for teachers involved with work-based learning and have developed principles or blueprints for use by other school systems who might design work site experiences. In general, program developers found that teachers need an understanding of work practices and processes, including work's social settings and interactions, the cultures of work environments, perspectives of workers at all levels about learning over the lifespan, and how education is applied in workplaces. The undertone in most studies is that the teachers can best acquire this work-based knowledge through structured experiences in the workplace. The teachers also need knowledge about design of classrooms and instruction and assessment of student learning.

In their review of existing tech prep programs, Roegge, Wentling, and Bragg (1996) identified five critical themes in the design of teacher preparation to support implementation of tech prep and other forms of work-based learning:

- **Teaching/learning through application**, which is more than illustration and requires that teachers be able to apply their subject matter in a real-world context.
- **Student-centered/inquiry-based instruction**, which reflects the climate of the workplace and enhances students' ability to work both cooperatively and independently, to think critically, and to solve problems.

- **Vocational/academic integration**, which has implications for curriculum development, instructional design, and teaching methods.
- **Collaboration**, which includes articulation between educators at different levels of education systems, with individuals and groups outside of education, and among teachers within a school.
- **Real world experience**, which includes related work experience outside of teaching. This experience could be part of the teacher preparation program—either a course in the required sequence of preservice education or a requirement met by teacher candidates individually—or addressed through professional development for practicing teachers.

Lessons from Teacher Professional Development Work-Based Learning

Although few models may currently exist for incorporation of nonschool workplace experiences into preservice teacher education, much can be learned from the growing number of teacher internship and professional development programs in work and community settings that are being conducted in schools across the country, many of which are supported by school-to-work, youth apprenticeship, or tech prep federal funding. In addition, several major corporate foundations, including Bell South, Pew Charitable Trust, and CIBA Vision, have funded teacher professional development and internships as a strategy for improving education and strengthening the connections between school and work. Through an examination of current "teacher intern in industry" and other programs that introduce practicing teachers to work-based learning strategies (including how these programs are structured and what makes them successful), a set of key considerations and criteria for a preservice approach begins to emerge.

Educator Internships in Nonschool Settings. Teacher internships in community and work settings provide a form of professional development that places teachers in worksites and, through work-based strategies such as work observation and participation, enables teachers in varied subject disciplines to incorporate work applications into their teaching. Sargent and Ettinger (1998) define educator internships as "work site experience where the participants complete a series of activities and, after a period of reflection, produce a demonstrable product that can be used to improve their teaching" (p.1). In an examination of industry-based educator internship programs in the United States, they identified several structural components of effective programs:

- Involvement of business and industry partners in the program development
- A conceptual framework addressing new information and experiences needed by teachers to improve student learning and to design and implement effective work-based curricula
- A program design that increases teachers' awareness of and participation in the workplace and provides knowledge and experience that teachers need to prepare students to enter employment and to learn from workplace activities
- A process for integrating work site learning into the educational setting and curriculum
- Ongoing evaluation and improvement

Studies of what makes internships valuable for learners suggest that the *design* of educator internships needs to include four essential components: an action plan, a preinternship orientation, an experiential component, and time for reflection through connecting activities (Sargent and Ettinger 1998).

- **Action plans** should focus on two things: the objectives of the learners (what they want to do and how they will do it) and the translation of intern experiences into classroom applications and curriculum improvements.
- The **preinternship orientation** involves both the educator and the work site mentor in discussions of mutual goals and expectations, sharing of information about the organization where the internship will occur, and agreement on activities of the intern.
- The **experiential component** can vary in length from short-term job shadowing or observation visits to a full 40 hours per week for 8 weeks. Teacher interns are expected to pursue specific learning objectives, complete a planned series of activities, and produce a project that applies their experience to school-based teaching and learning. The internship may allow the teacher to have a single, focused, in-depth experience or a wide variety of experiences across multiple businesses or units of an organization. Depth of involvement may also vary from observation and shadowing of employees to having responsibility for projects, services, or production activities at the work site. Varying types of work involvement are often of value both to the teacher intern and to the business or industry participating with the school. Thus the internship selected may relate to the knowledge, skills, and experiences the employee and the intern each bring to the intern assignment.

- **Connecting activities**—both group and individual—are an important part of a teacher internship. Group activities might include a series of seminars or workshops during and following the internship to encourage discussion, information sharing, and collaborative exercises. Topics may include learning theories, alternative instructional methods and assessment approaches, and strategies for integrating work site examples and new understandings into specific curriculum. Individual documentation of the work site experiences by interns through daily journal entries and written narratives provides an opportunity to reflect on the relevance of their learning for instruction and classroom applications. A final product or project by interns is a critical part of their integrating their work experiences into the educational setting. The project might be a complete curriculum, materials for a teaching unit, or career planning activities for students. Formal presentations to peers and articles for school newsletters are also ways to share information about infusing workplace experiences into the curriculum and classroom.

Mini-Sabbaticals in Industry. Stasz (1997a) identified what teachers need to know to teach school-to-career approaches to learning and generic skills for the workplace: knowledge about work, knowledge about designing classrooms and instruction, and knowledge about assessing student learning. Her Classrooms that Work model, which is based on this conceptual framework and ongoing research about teaching generic skills in academic and vocational settings, requires that teachers develop an understanding of work practices and processes, including the social settings, the cultures of work environments, and the perspectives of workers at all levels through structured observation of work sites. Beginning with the premise that traditional academic teacher training—which emphasizes traditional subject matter preparation and traditional teaching methods—is not adequate for preparing students for work, Stasz' mini-sabbatical is based on the idea that teachers need a deeper knowledge of work and work practice before they can use occupational contexts for teaching. Linking teachers with workplaces and workers as sources of knowledge about real-world contexts allows teachers to identify where generic and subject specific knowledge is required and used, so that the content of their instruction will be more authentic, even if they continue using traditional teaching methods. Teachers are helped to create a "culture of practice" that mirrors actual work situations and roles and that requires students to apply knowledge and skills in simulated work settings. The pedagogy that supports this authentic learning is activity oriented, student centered, and project based. The cognitive apprentice methods of modeling, coaching, scaffolding, and fading are used, as well as alternative assessments that provide different evaluation strategies for different purposes.

To implement this model, Stasz (1997a) and her colleagues at RAND (Stasz, MacArthur, Lewis, and Ramsey 1990; Stasz, Ramsey, Eden, DaVanzo, Farris, and Lewis 1993) developed a teacher training guide for a 6-week mini-sabbatical workplace internship experience for teachers to help them integrate vocational and academic education and improve school-to-career transitions. The goals of the mini-sabbatical are as follows:

> To enable teachers to acquire skills and behaviors that will (1) increase their knowledge of work practice; (2) help them create a high quality, integrated curriculum that incorporates domain-specific (e.g., academic, technical) and generic (e.g., problem solving, communications) skills; (3) help them design classrooms that promote authentic learning; and (4) help them develop assessments that provide meaningful feedback to the students and teacher. (p. 1)

The mini-sabbaticals begin with 2 weeks during which teachers learn to use ethnographic techniques for observing work sites and conduct multiday worksite observations to identify elements of authentic practice that could be included in a curriculum. During the next 2 weeks, teachers apply observations to curriculum design—developing instructional goals, classroom techniques, and teacher and student roles. In the final 2 weeks, participants teach their work-based curriculum unit and assess learning.

The Classrooms that Work model has been pilot tested with a small group of teachers. Findings from the pilot study of the mini-sabbatical led to identification of areas that have significance in the design of preservice teacher education programs. Researchers found that the workplace observations were successful in assisting teachers in thinking about the workplace as a source of information for instruction that would both engage students in learning and teach subject-specific academic knowledge. Teachers were able to learn about the social nature of work (e.g., how teams functioned) and about the knowledge and skills needed to complete various work tasks. These experiences provided teachers with problems and projects they could simulate in the classroom. Researchers also found that work experience alone was not sufficient for developing work-related curriculum. Teachers needed help in translating their experience in workplace into learning activities; in broadening their instructional planning to include teaching and learning generic work skills and work-related attitudes in addition to basic subject matter; in considering ways of incorporating relevant aspects of work practices into the classroom; and in planning for working collaboratively with other teachers (learning communities).

Workplace Professional Development Guidelines. Building on the philosophy that all students will learn best from teachers who have an understanding of the skills and technologies required in a changing economy and who can incorporate this understanding into their teaching, the Northwest Regional Educational Laboratory developed a ***Field Guide for Teachers Learning in the Community*** (pilot version, 1997). This guide is intended to support schools' efforts to partner with business, industry, and other community agencies for the purpose of teacher professional development. Workplaces in the community are seen as resources for connecting school learning with the world outside the classroom. The guide identifies and structures a number of workplace professional development activities:

- The **learning site analysis** is a brief (1-hour) introductory meeting and structured conversation with a worksite contact person to discuss academic and technical skills required at the workplace, characteristics of the organization and work practices, and potential learning opportunities for students.
- **Job shadowing** is a short-term (half- or full-day) workplace experience during which teachers interview employers and observe workers performing daily routines to gain insight into skills used in work settings.
- A **teacher workplace internship** may last 2-12 weeks during the school year or summer and may include a stipend. This experience includes hands-on experiences in a workplace to learn and practice skills and knowledge that may result in a product or project for the organization. It also includes developing specific plans for incorporating information into curriculum and pedagogy. Activities included in the internship include keeping a daily journal and weekly log, conducting a workplace overview and employee interviews, and action planning.
- **Telementoring** involves one-on-one contacts by electronic mail or videoconferencing between a teacher and an employer to explore connections between school and work and to develop integrated student projects for existing or new curricula.

The Evolving Teacher Knowledge Base

An examination of the literature reveals an evolving knowledge base among teachers who have used workplaces for learning purposes over many years. The growing body of knowledge includes common knowledge about the world of work, workplaces, work forces, industries, and occupations and about employer, worker, family and community relationships. This common knowledge of and about work is grounded in theories of career development, work ethics, customer-client relationships, sociology of workplaces, labor economics, and organization and management theory (Lynch 1997). It is becoming evident that work-based learning and school-to-work initiatives increasingly will make these ideas the centerpiece in programs of study for both the general and professional education of all teachers.

For those who will teach in high schools or programs with goals related to technical preparation, school-to-work, and vocational or career education, the knowledge base about work is more specialized and requires in-depth study and work experiences in related industries (e.g., music, the professions, manufacturing, business, science). Many vocational education teachers have had to include paid work experience as part of their portfolio to obtain a state license to teach in public schools. This work experience—acquired prior to enrolling in teacher preparation or earned through university-supervised internships—has been found to help them contextualize academic and technical content and prepare career-bound students for the real world of employment (Lynch 1998).

Skills and knowledge needed by students to succeed in the world of work have been identified by numerous national and regional groups, the most well known of which is the 1991 Secretary's Commission on Achieving Necessary Skills (SCANS). This group's U.S. Department of Labor report, ***What Work Requires of Schools***, identifies generic workplace skills, including basic skills, thinking skills, and personal qualities as well as competencies in resources, systems, technologies, information, and interpersonal areas that employers insist students will need to be successful in current and future workplaces. These skills are the most likely to be integrated into a broad range of academic subjects, and they can provide a structure for colleges' and universities' required work-based outcomes for students in teacher preparation programs. In a similar vein, the phrase "all aspects of the industry," used in federal school-to-work initiatives, refers to a broad-based awareness and understanding of work and the community. It encourages educators to make students aware of those common elements that characterize all industries: planning, management, finance, technical and production skills, underlying principles of technology, labor, community issues, health, safety, and environmental issues. These element permeate the common knowledge base about work discussed earlier.

Although the appropriate depth and breadth of work and workplace knowledge will depend on the age and developmental level of the students, there appears to be general agreement on two points related to the inclusion of work-based learning in the curriculum that apply across all levels:

- All teachers should have some preparation in how knowledge is applied in workplaces and other community environments.
- All teachers need to know how to contextualize their lessons from academic content into real-world environments, especially workplaces.

These points remain at the core of efforts to integrate work-based learning into preservice teacher education.

Integrating Work-Based Learning into Preservice Teacher Education

In this section, four foundational themes for integrating work-based learning strategies into teacher education are presented, and a model for designing work-based learning strategies is offered.

Foundational Themes for Work-Based Learning in Teacher Education

An understanding of how to embed academics in the context of the workplace is emerging from a variety of studies, experiments, the research and literature on vocational and technical education, and the wisdom of teachers with experience in work-based learning. Among recent studies three stand out as paramount. Hamilton and Hamilton (1997a) directed a youth apprenticeship demonstration project for 4 years at Cornell University. Phelps (1998) and his colleagues at the Center on Education and Work at the University of Wisconsin investigated teacher professional development programs that focused on teacher learning in the workplace and community. Finch, Schmidt, and Moore (1997) conducted studies for the National Center on Research in Vocational Education designed to address two questions: What teacher activities contribute to school-to-work success? and What understanding, knowledge, and skills must teachers have to conduct successful school-to-work programs? There is also a useful history and wisdom among vocational teacher educators and staff developers who have long offered or required work-based learning in the preservice preparation of teachers and offered occupational updating as part of the lifelong learning of inservice teachers (Hartley and Wentling 1996; Lynch 1997; Lynch and Griggs 1989).

From all of these sources, four themes emerge as integral to the initial preparation of teachers in work-based learning.

Theme 1: Preservice teacher education students need to understand the workplace as a system, a learning place, and a social environment.

Preservice teachers in all subject disciplines need a general understanding of the workplace, including the nature of work in society; the culture and social organization of modern work roles, settings, and practices; and how knowledge is used in work activities. Teacher knowledge and understanding about the workplace is essential for the creation of the authentic, contextual learning environments and projects offered in school-based settings to prepare students for work and to support student work-based learning experiences. Preservice teacher education should prepare future teachers to—

- Understand the larger context in which work occurs, including the economic and organizational structures surrounding work practices
- Understand how learning occurs in the workplace or in settings other than school
- Gather work-related information useful in designing and teaching their classes
- Explain to students how work is conducted in a variety of businesses, industries, and professions and what workers do and need to know and how they learn this

Theme 2: Preservice teacher education students need to connect knowledge from workplaces with school curriculum and instruction

Successful work-based learning in education requires that teachers be able to recognize learning situations as they occur in the workplace and to understand the relationships between students and the workplace that need to be established and supported in order to make that learning happen. Preservice teacher education should prepare future teachers to—

- Understand the cooperative process of providing guidance to young people as they develop personal and social competence
- Understand the expectations of the workplace and how to translate what workers do and need to know into authentic curriculum and learning experiences
- Understand the advisory role of business and industry and the ways that businesses and industries can provide resources to schools
- Understand how industry people can be valuable in assessing student performance in both school-based and work-based instruction
- Use feedback from student work-based learning experiences to create curriculum changes and to enrich classroom activities
- Introduce students to the larger context in which they will do their work, including the economic and organizational structures surrounding them
- Include a workplace focus in school instruction as sometimes highlighted in career academies

Theme 3: Preservice teacher education students need to use authentic and contextual learning activities with their future students.

Preservice teachers need to understand the theory base that supports teaching in a contextual, authentic manner and be able to apply it in the design and delivery of instruction that is both work based and school based. Both situated cognition and constructivist learning theories support the types of activities required in work-based learning applications. The emerging research from both of these areas, including uses of cognitive apprentice learning strategies, provide evidence for a sound framework for developing effective school and work-based learning. Preservice teacher education should prepare future teachers to—

- Identify appropriate work-based learning objectives and plan the supporting activities that enable student achievement
- Integrate work-based learning objectives as modules or projects in core and elective units
- Plan cooperatively with other teachers to provide classroom experiences that focus on workplace expectations and the situated nature of learning
- Translate what workers do and need to know into authentic learning experiences

- Organize classrooms to facilitate active learning and the construction of knowledge related to real-life applications
- Use applied instruction and project-based learning to teach multiple skills and broad knowledge that integrates academic and vocational learning

Theme 4: Preservice teacher education students need to know how to involve their future students in age-appropriate, high-quality, competency-building learning experiences in the workplace or community.

Teachers need to be familiar with activities through which they can facilitate student involvement in a work-based learning environment and to understand the teacher's role in that involvement. They need to know how to use community resources and to interact with workplace representatives in the cooperative venture of designing age-appropriate, high-quality, work-based learning for their students. Preservice teacher education should prepare future teachers to—

- Understand and apply learning theory that provides a foundation for the organization of work-based student learning activities
- Use occupationally related knowledge, instructional expertise, and associated knowledge to interface effectively with employers
- Understand how to involve workplace representatives in presentations that help bring the workplace to the classroom
- Plan and arrange learning experiences in settings outside of school
- Understand the various types of work-based learning experiences (mentoring, shadowing, interning, co-oping, and youth apprenticeship)
- Understand the key responsibilities of the work-based learning coordinator, manager, learning coach, and mentor in work-based learning activities
- Understand the roles of formally assigned work-based teachers in work sites and be able to participate in orienting, training, and supporting adult workers who teach young people at the work sites
- Collaborate with workplace representatives to plan an increasingly challenging multiyear learning plan for students

Designing Preservice Teacher Education Work-Based Learning Strategies

The overall goal of preservice teacher education work-based learning strategies is to ensure that graduates will leave the program able to understand work practices and settings; understand and incorporate concepts of work practices into curriculum and instruction; develop and use authentic and contextual teaching and learning activities in school settings; involve students in work-based learning experiences; and develop and use authentic assessment to evaluate work-based learning (Darling-Hammond and Snyder, chapter in this volume).

Drawing upon the lessons from teacher professional development activities and the four foundational themes that have been presented, we can begin to describe the kinds of work-based learning experiences and curriculum components that need to be developed and incorporated into *preservice* teacher education programs in order to meet this goal. A proposed preservice work-based learning teacher education model is offered in this section, consisting of three components: (1) the body of knowledge about work and workplaces to be taught as part of the school curriculum, (2) teaching strategies for contextualizing and integrating academic and vocational knowledge so that learning draws from and can be applied in authentic work settings, and (3) experiences involving teachers in nonschool work settings, to enable them to gain essential information and resources through which to build work-based learning into the curriculum and pedagogy. Each component is described here, along with questions that still need to be addressed in this evolving process.

Component 1: Work and the Workplace as Curriculum Content. There is a body of knowledge that all students need to acquire about work as a part of life. This knowledge should be incorporated into the preservice teacher education curriculum content to prepare them for a lifetime of learning in both work and education settings. Work and workplace knowledge topics are listed. In addition, millions of high school graduates will enter workplaces full time each year, and these students need specialized technical skills.

The key questions to be asked in redesigning teacher education curricula are: What is it that teachers need to know about work outside of education? and How can this knowledge be integrated into the curriculum taught in colleges and universities?

Work and Workplace Content

- Sociology of work, and work and society
- Culture of the workplace
- Economic principles and philosophy
- Ethics of business and professions
- Worker-employer relationships
- Generic work processes such as problem solving, teamwork, and effective communication (i.e., the SCANS competencies)
- Work ethic and employability issues
- Work and family options
- Technology's impact on work processes and structure
- Career patterns and life/work choices; management practices
- Employee-customer relationships

Component 2: Work-Based Learning as a Contextual Approach to Teaching and Learning. What is known about situated cognition, cognitive apprenticeship, and contextual learning, as discussed by Borko and Putnam (chapter in this volume), provides a conceptual and research basis for using contextual teaching strategies in preservice teacher education. Work-based learning strategies should be used in teaching to increase the relevance of learning and thereby improve student motivation, achievement, involvement, learning transfer, and school retention. Strategies from cognitive apprenticeship, such as modeling, coaching, scaffolding, articulation, reflection, and exploration, have direct application for these purposes. We must also ask: What does the teacher need to know about how to teach contextually? and What pedagogical strategies are needed for relating content to the various contexts in which it is used in the workplace or community and integrating academic with vocational learning?

Workplaces provide both a source of information to be taught and a location where that learning can be acquired. Cognitive apprenticeship proponents argue that contextual learning can occur in other than authentic work sites if it simulates or incorporates elements of practice that occur in workplaces and relates abstract concepts to actual applications or real-life contexts and examples from work and community settings (Borko and Putnam in this volume). However, an increasing emphasis in the school-to-work approach is to identify, structure, and support opportunities for students to learn in other than school-based settings. This raises additional questions to be considered in relation to preservice teacher education: What do teachers need to know about how to develop work-based learning opportunities for their students in the local community? How should student work-based learning experiences and activities be initiated, structured, implemented, coordinated, and evaluated, and how should they be connected to school-based learning? How can schools use work sites as learning sites, and what are the problems and processes involved in doing this?

Component 3: Experiences in/from Nonschool Work Settings as a Vehicle for Teacher Learning. Teacher education uses experiential learning when it places preservice students into school classrooms to learn about the culture of schools and to observe and practice teaching activities and skills. However, this approach applies only to work settings in schools and does not address the broader scope of work settings in which most of the *students* of these teachers will need to function after leaving formal schooling settings. In fact, many novice teachers have little—if any—exposure to work settings other than schools. This raises the question, How can preservice teacher education itself be contextualized to expose teacher education students to work settings other than in those educational settings so that they can acquire the knowledge and experience to use work-based learning in their subsequent teaching role?

If it is important to prepare teachers to teach about work and to use contextual approaches including work-based learning, preservice programs should incorporate these elements into their curriculum both as content and process. To do this, teacher education faculty will need to broaden their own experience with work-based learning and varied work settings. Another issue here is the need to provide opportunities for university teacher educators to experience the realities of today's workplaces so that they are able to convey this information to their students and assist them in making connections between work-based learning in business/industry/professions and the teaching methods and materials for integrating work-based learning into the schools. This experiential component can take several forms, including preservice industry-based workplace internships or clinicals; paid internships in business, industry, or professional settings involving completion of short-term projects or services; university-sponsored cooperative education; teacher sabbaticals (for college professors); and industry visit/analysis, employer interviews, work site observations, or job shadowing.

Regardless of format, there are several critical elements that should be part of preservice teacher workplace experiences and professional sabbaticals to ensure utility and quality:

- Conceptual grounding of what is to be learned and why
- Joint planning and preparation with the business partner and university representative prior to going on site
- A variety of relevant activities and experiences
- A product or products to be produced related to the objectives of the work-based experience.
- Opportunities to reflect, discuss, and make connections

- Application and integration of learning into teaching methods and content
- Subsequent assessment and evaluation of the work-based learning experience

The specific design and related detail should model the lessons learned from professional development programs described earlier in this paper and the work-based learning approaches used in public schools (see Appendix A). Most essential is that the work-based learning acquired from the nonschool work setting experience(s) be integrated into the students' preservice curriculum. That is, the lessons learned from experiences in nonschool settings should be used as one basis from which preservice teacher education students write learning objectives, create lesson plans, design course content and experiences, provide illustrative cases and examples to contextualize learning, and motivate students to master required content.

Conclusion

Colleges and universities should include work-based learning strategies as an integral part of the teacher preparation curriculum and pedagogy. Research from the cognitive sciences shows that students learn more and better when content is situated in real-world contexts. There is preliminary evidence that work-based learning may have positive impacts on students' grades, motivation, attendance, and likelihood of pursuing further education. Students who take part in work-based learning experiences acquire employability skills; strengthen resourcefulness, problem-solving skills, self-confidence, and responsibility; and develop human relations skills through personal interaction with employers and customers. At the same time, employers who take part in work-based learning experiences enhance their own position by ensuring that the education community understands the skills and knowledge they require of workers and by helping to develop those qualities in the future work force.

> “Research from the cognitive sciences shows that students learn more and better when content is situated in real-world contexts.”

In designing work-based learning for preservice teacher education students, educators need to include experiences that develop in students an understanding of the workplace as a system, a learning place, and a social environment; that enable them to connect workplace knowledge with school curriculum and instruction; that prepare students to use authentic and contextual learning activities with their future students; and that teach them how to involve their future students in age-appropriate, high-quality, competency-building learning experiences in the workplace or community.

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Appendix A: Work-Based Learning Approaches

The oldest and most often used model of work-based learning in the United States is cooperative education (co-op), in which students engage in a coordinated program of school-based learning and paid career-related work experience to earn credit in high school or college. About half of high schools and community colleges offer co-op, although only a small percentage of all students typically participate (OTA 1995).

Clinical training, internships, and practicum are used most heavily in health/medical and other professional and occupational programs. Work site experience is not paid, is linked closely with school-based course work, and may involve extensive hours especially if leading to licensure in medical fields.

One of the newest work-based learning models is youth apprenticeships, which are articulated programs extending from high school through postsecondary and including employer-paid work experience, work site mentoring and training, counseling, and integration of academic and occupational instruction.

Career academies within high schools focus their curriculum on one cluster of occupations, integrating academic education with occupational preparation and career orientation, and including part-time or summer employment.

School-based enterprises are small business ventures located within a school where students produce goods and services for customers. Coordination of classroom courses and work-based learning in the enterprise is controlled by the school.

Job shadowing experiences in business and industry involve short-term visits by students to observe workers and the processes of a work setting and culture.

The following chart provides additional information about these approaches, including a description, formal linkage to postsecondary education, payment for work-based learning, grade levels served, school-based related learning, and expected credentials.

WORK-BASED LEARNING APPROACHES*

APPROACH	DESCRIPTION OF APPROACH	FORMAL LINKAGE TO POSTSECONDARY EDUCATION	PAYMENT FOR WORK-BASED LEARNING	GRADE LEVELS SERVED	SCHOOL-BASED RELATED LEARNING	EXPECTED CREDENTIALS
COOPERATIVE EDUCATION (SECONDARY)	A combination of vocational and academic course work and worksite experiences in which students earn credit working on jobs secured through written cooperative training agreements and plans	Not usually	Yes; students work part time (15-20 hours per week) in a local business or industry, usually at minimum wage	11-12	Yes; required enrollment in a minimum of one vocational specific related class (e.g., marketing, business, diversified, trade, or industrial)	None, other than expected degree (high school diploma) from educational institution
COOPERATIVE EDUCATION (POST-SECONDARY)	A combination of course work and career-related work experience in a coordinated program	N/A	Yes; students work part time or full time (alternating full-time periods of course) in a business or industry, usually at minimum wage	13-16	Sometimes; a related course or seminar may be required	Postsecondary degree or certificate
YOUTH APPRENTICESHIP	An articulated curriculum linking secondary and postsecondary education that incorporates employer-paid experience and guided worksite learning	Yes	Yes; students work part time in a business or industry at a progressive wage scale	11-14	Yes; required enrollment in one or more specific related classes at secondary level articulated to a postsecondary degree or certificate program within an occupational area	High school diploma; postsecondary degree or certificate; occupational skills certificate recognized by business and industry
SCHOOL-TO-REGISTERED APPRENTICESHIP	Worksite learning begins as a part-time experience in secondary school in a union and employer apprenticeship program registered with the Bureau of Appren-ticeship Training of the U.S. Dept. of Labor	Sometimes	Yes; student apprentices function as part-time workers at minimum or union wages until graduation from high school and then function as full-time workers with progressive wage rates	12-14	Yes; secondary instruction in vocational-related course and part-time in-school related instruction for a few hours per week upon entering registered apprenticeship program	Certificate of completion from the U.S. Dept. of Labor or a federally approved state apprenticeship agency

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APPROACH	DESCRIPTION OF APPROACH	FORMAL LINKAGE TO POSTSECONDARY EDUCATION	PAYMENT FOR WORK-BASED LEARNING	GRADE LEVELS SERVED	SCHOOL-BASED RELATED LEARNING	EXPECTED CREDENTIALS
FORMAL REGISTERED APPRENTICESHIP	Adult apprenticeship experiences formally registered with the Bureau of Apprenticeship Training of the U.S. Dept. of Labor	Sometimes	Yes; apprentices function as full-time workers with progressive wage rates	Usually students who have completed full-time schooling (either secondary or postsecondary)	Yes; part-time related instruction in school for a few hours per week	Certificate of completion from the U.S. Dept. of Labor or a federally approved state apprenticeship agency
CLINICAL EXPERIENCE	Worksite learning that occurs in association with preparation for a credential in a professional field such as health care, law, or education	Usually	Seldom	11-16	Yes; enrollment in a program of study with specific occupationally related courses	High school diploma; postsecondary degree or credential
INTERNSHIP OR PRACTICUM	An arranged field-based training at a worksite as a capstone experience in a career preparation program	Usually	Seldom	11-16	Sometimes, a related course or seminar may be required	High school diploma; postsecondary degree or credential
SCHOOL-BASED ENTERPRISE	Small businesses created and operated by students where the educational institution implements a real, economically viable business venture	Seldom	Seldom; students may be paid in the form of an hourly wage for their work, a stipend, or a percentage from the profits generated from the goods or services produced or sold	7-16	Sometimes, a related course or seminar may be required	None, other than expected degree (high school diploma; postsecondary degree) from educational institution

APPROACH	DESCRIPTION OF APPROACH	FORMAL LINKAGE TO POSTSECONDARY EDUCATION	PAYMENT FOR WORK-BASED LEARNING	GRADE LEVELS SERVED	SCHOOL-BASED RELATED LEARNING	EXPECTED CREDENTIALS
CAREER ACADEMY (SECONDARY)	A career-oriented "school within a school" focused on an occupational cluster that integrates academic learning, career exploration, occupational preparation, and part-time or summer worksite learning	Sometimes	Sometimes; students work in internships (paid and nonpaid) during the summer between junior and senior year and, in some programs, during the last half of the senior year	11-12	Yes; academic and occupation-related learning are integrated in a curriculum built around a single industry cluster (e.g., agriculture, business, health) and delivered by a group if academic and vocational teachers	High school diploma and an occupational certificate in the industry cluster
COMMUNITY SERVICE (VOLUNTEERISM)	Activities that link students with community organizations or activities that help others which may or may not be integrated with classroom learning	No	No	9-16	Sometimes; learning from community service may be integrated into school-based learning	None, other than expected degree (high school diploma; postsecondary degree) from educational institution
JOB SHADOWING	Experiential learning activities which are normally designed to be short-term, nonintrusive direct observation of individuals who are directly involved in the workplace	No	No	7-12	Sometimes; experience may relate to a career exploration course or assignment	None, other than expected degree (high school diploma; postsecondary degree) from educational institution
CAREER AWARENESS AND EXPLORATION	Variety of age- appropriate activities designed to connect student learning with its applications in real-world workplaces (e.g., field trips, day-on-the-job, career interviews, website visits, etc.)	No	No	K-9	Always connected with lessons being studied in such core areas as math, science, fine arts, language arts, and social studies.	None, other than as an integral part of the academic suject(s) being studied.

*Note: There are varying definitions of some of these approaches. In addition, programs sometimes make intentional modifications in implementing the particular approach to work-based learning. This chart was adapted from several sources, but primarily from "*Learning to Work*," Office of Technology Assessment, U.S. Congress, September 1995, pp. 58-59 and Lynch, R.L. "Work-Based Learning Approaches," ***The Reporter***, Fall 1996, pp. 8-9.

Culturally Relevant Pedagogy in Contextual Teaching and Learning

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This nation's classrooms are a key force in an ongoing struggle to build an inclusive society for all children, and teachers play a vital role in creating those classroom and school environments. In any classroom there are differences in race, ethnicity, language, social class, religion, gender, sexual orientation, family structure, and ability/disability. These differences are only the beginning: students also vary in terms of academic and social skills, self-confidence, size, interests, and many other dimensions. As the nation's school population shifts to a more racially, culturally, linguistically, and ethnically diverse composition of students with diverse life experiences, the population of teachers grows more homogeneous.

Teacher educators committed to children's learning and social development must be concerned about the power of cultural, social, economic, and political dynamics shaping children's education futures and about preparing a teaching force dedicated to fairness, equity, and social justice. What is currently at stake is not just the narrow view of academic achievement as school mission, but a school preparation that embraces DuBois's (1903) goals of work, culture, and freedom. Fulfilling the promise of children's powerful learning to promote their participation in a multiracial, multiethnic democracy challenges teacher educators to reconsider what is important for novice teachers to know and be able to do.

If preservice teachers are to develop the belief that all students can succeed and the understandings, skills, and will to enact that vision, they will need significant opportunities to examine and cultivate their own knowledge, skills, and dispositions. How do teacher education programs best create opportunities to prepare preservice teachers to provide an education of excellence to children who are members of groups traditionally unserved, underserved, and inappropriately served in schools? Although deep subject matter knowledge and understanding of pedagogy are critical pieces in fostering contextual teaching and learning, the particular emphasis of this paper is on an equally important phenomenon: children's diversity and how the changing demography of the nation's student body interacts with the kind of knowledge, dispositions, and understandings necessary for those who will be their teachers.

Extending to all children learning of the sort prescribed by reformers and hoped for by parents relates not just to how we think about teaching and learning, but also to the social context, the institutional nature of schools, and teachers' images of what learners can do. The focus here on teachers and their preparation is not intended to dismiss the importance of social context, power relationships, and institutional practices in shaping children's opportunities and teachers' work. These are critically important. Rather, this emphasis on teachers and their preparation is intended to extend a framework of systemic and cultural considerations to include both institutional and interpersonal dynamics—to recognize an agency among teachers to act and to nurture among children a sense of competence, discovery, caring, and community.

Most of us *all* can point to teachers who pushed us, taught us, and believed in us—teachers who held visions of us that we could not imagine for ourselves (Delpit 1995). How do future-teacher students develop this vision for children of strangers? How do they learn to enact it? How do they develop a will to dismantle the artificial limitations we build around children based on what they look like, what language is spoken at home, what their physical capabilities or limitations are, with whom they live, and where they live? Given the multiracial and multicultural nature of the school-age population and our ideal of a socially just, democratic society, how will preservice programs prepare future teachers to foster antiracist, inclusive, and multicultural practices?

Through a review of the literature focused on developing preservice teachers' understandings and dispositions about pluralism and equity in teacher education programs, this paper attempts to respond to these questions. To the extent that the issues and strategies discussed here highlight especially the aspects of learner diversity related to children's race, ethnicity, language, and social class, they do so as a lens for considering the full range of children's pluralism and in recognition of our historic difficulty and discomfort in openly talking about race, racism, ethnocentrism, and language discrimination. What we learn about educating students who are racially and culturally different from their teachers will help us serve all students, regardless of the nature of the diversity.

Schoolchildren and Their Future Teachers: The Disconnection

As the turn of the century approaches, a significant feature of the school-age population is its increasing multiracial, multiethnic, and multilingual pluralism. Los Angeles schools, for example, serve a student population where more than 77 different languages are spoken in children's homes, including Kurdish, Assyrian, Norwegian, and Punjabi ("Quality Counts '98" 1998, p. 109). Garcia (1997) reports that "one in every three children nationwide is from an ethnic or racial minority group, one in every seven children speaks a language other than English at home, and one in fifteen children was born outside the U.S." (p. ix).

In the largest metropolitan areas, more than half of the public school population are children of color (American Council of Education 1988). According to Natriello, McDill, and Pallas (1990), in 1988 about 7 in 10 children were white; that proportion will change to about 1 in 2 children in 2020. The largest growth during that period will occur among Latino children, whose numbers will nearly triple, from 6.8 million to 18.6 million, nearly offsetting a decline of more than 12 million white youth (Natriello, McDill, and Pallas 1990, p. 36).

In light of this diversity—not only racial and ethnic group but social class, gender, religion, and the other dimensions discussed earlier—Darling-Hammond, Wise, and Klein (1995) describe the continuing pressure on teacher education programs to prepare novices more effectively for the children they will teach:

> This new mission for education requires substantially more knowledge and radically different skills for teachers. . . . If all children are to be effectively taught, teachers must be prepared to address the substantial diversity in experiences children bring with them to school—the wide range of language, cultures, exceptionalities, learning styles, talents, and intelligences that in turn requires an equally rich and varied repertoire of teaching strategies. In addition, teaching for universal learning demands a highly developed ability to discover what children know and can do, as well as how they think and how they learn, and to match learning and performance opportunities to the needs of individual children. (p. 2)

Despite contributions of these groups to U.S. culture, and the learning opportunities for inclusion presented by this pluralism, insidious systemic inequities—social, political, and economic—continue to exacerbate institutional and individual inequities. The list is long: racist attitudes and expectations; inequitable financing of schools; biases in textbooks and instructional materials; disproportionate assignments to tracked classrooms and ability groups; and unfair differences in curricular, technology, and human resources, in the conditions of the physical plant, in class and school sizes, and in other measures of school quality (see, for example, Hilliard 1997; King 1991; Kozol 1991; Nieto 1996; Oakes 1985; and Young and Melnick 1988).

Variability in opportunities for students in particular communities also can be explained by what their teachers know and know how to do. As Darling-Hammond and Futrell and Witty observe, the roles of teachers and teaching are central:

> While some children are gaining access to teachers who are more qualified and better prepared than in years past, a growing number of poor and minority children are being taught by teachers who are sorely unprepared for the demands of their jobs. This creates even greater inequality in opportunities to learn and in the outcomes of schooling. (Darling-Hammond 1997, p. xi)

> For millions of racial and language minority children, children who live in resource-poor urban and rural areas, and children who come from cultures considered non-mainstream, . . . [their] future depends on the conditions of the schools they attend. It depends on the quality of the ethos in the schools, on whether these schools are culturally responsive to the students they serve. Most important, these children's future depends on the quality of teaching that occurs in their classroom. (Futrell and Witty 1997, p. 212)

These demographic shifts also press us to reexamine implicit assumptions of schools as white mainstream institutions (Perry and Fraser 1993). From this vantage point, other inequities become more visible, particularly those arising when children behave in ways different from culturally based "norms" (Auerbach 1989). Limited historical knowledge and study of ethnic groups can foster inaccurate assessments of children's competence and ability (Hilliard 1997; Pang 1997). Failure to understand differences in learning styles, differences in cultural styles of language use and interaction patterns, and differences between classroom culture and children's out-of-school environment can lead to teachers misreading students' aptitudes and abilities and to misattributions of student deficiency (Cazden and Mehan 1989; Comer 1980; Delpit 1992; Heath 1983, 1988; Perry and Delpit 1998).

Teacher expectations are a critical part of this discussion. In his description of conditions that interfere with an effective teacher education, for example, Goodlad (1990) directs our attention to teacher beliefs and expectations: "Belief in the incapability of many children and youths to learn abounds. Horrifyingly large numbers of teachers share this belief; indeed, they use it to excuse their own failures" (p. 60). It is relatively difficult for children of color, particularly children with fewer socioeconomic advantages, to overcome teachers' assumptions that their failure to thrive intellectually is due to some deficit in them, their family, and their community rather than to a deficit in teaching, in curricular perspectives, in conceptions of capable students, or in what students have opportunities to learn (Delpit 1992; Howard 1990; Ladson-Billings 1994).

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In the coming years, the numbers of cross-cultural encounters between teachers and their students will grow rather than wane. Over the next decade, U.S. schools are expected to need 2 million new teachers ("Quality Counts '98" 1998). The diversity in race, ethnicity, language, and social class that describes the student population will be significantly less so among school teachers as the teaching population grows more homogeneous. The American Association of Colleges for Teacher Education (1990) reports, for example, that African Americans comprised 6.8 percent of the 1989 enrollment in teacher education programs; Latinos made up only 2.7 percent; Asian and Pacific Island Americans made up less than 1 percent. Despite policies and strategies to recruit and retain teachers of color, and the importance of continuing to do so in more active ways, Banks (1991) observes that such efforts will nonetheless likely result in a largely white national teaching force:

> Even if we are successful in increasing the percentage of teachers of color from the projected 5% in 2000 to 15%, 85% of the nation's teachers will still be white, mainstream and largely female working with students who differ from them racially, culturally, and in social class status. (pp. 135-136)

In addition to being white, most future teachers will be monolingual, from primarily suburban and small-town experiences; most will attend a college less than 100 miles from home (Zimpher and Ashburn 1992). Cazden and Mehan (1989) present this profile of a beginning teacher in the 1990s: "[She will be] female, in the early to mid-twenties, Anglo, and from a lower-middle-income to middle-income family. It is important to realize that these will be the characteristics of beginning teachers, because they will not match those of their pupils" (p. 47).

Each preservice teacher education student brings a lifetime of experience, knowledge, beliefs, and perceptions of self that influence her learning and actions (Pajares 1992). These students' own histories of schooling, family, and privilege, including their ideas about children, reflect the limitations and parochialism of preservice teachers' prior experience (Feiman-Nemser and Buchmann 1986; Floden, Buchmann, and Schwille 1987; Kagan 1992; Zimpher and Ashburn 1992). Most novice teachers have lived lives in isolation from people of color and distant from concentrated-poverty neighborhoods (Dilworth 1992; Goodlad 1990). Early socialization and media images fuel fears and beliefs about student deficiency (Steele 1992; Young 1998). Cultural assumptions linking differences to deficiency and dysfunctionality are reported by a number of education researchers (Burstein and Cabello 1989; King 1991; King and Ladson-Billings 1990; Sleeter and Grant 1988). The goal of educating children to high academic standards in an increasingly culturally diverse and unequal society becomes problematic for preservice teachers who want and expect to teach children very much like themselves and who have little personal experience with children who are not (Zeichner and Melnick 1996; Zimpher and Ashburn 1992).

Paine's (1989) assessment of the orientations prospective teachers bring to understandings of student diversity mirrors findings from other studies: how teacher education students think about their own teaching and pupils is largely influenced by prior experience. She analyzed National Center for Research on Teacher Education surveys of 233 preservice elementary and secondary students at the beginning of their teacher education programs. Responses about diversity and social inequality highlight students' lack of knowledge about people different from themselves—by attributions of racial and cultural stereotypes and by attributions of dysfunctionality and deficiency when children's ways of being fall outside a monocultural mainstream. Socially constructed causes of differences and any pedagogical implications of student diversity are largely ignored. Although they expressed concerns about equity and fairness, preservice teachers in Paine's sample tended to see differences among students as decontextualized, making it difficult for them to translate these abstract notions to classroom life. Consequently, they suggested teaching methods that treat diversity as a problem, not as a phenomenon: "These teachers bring approaches to diversity that have the potential for reproducing inequality and reflect larger social and historical dilemmas" (p. 20).

In sum, these and other findings argue for the importance of "multicultural education," "culturally relevant teaching," "teacher education for cultural diversity," for considering issues of race, ethnicity, language, social class, exceptionality, and gender, for example, in the teacher education preservice experience.

The incongruence between preservice teachers' cultural insularity and children's pluralism is well known; however, only marginal attention is given to such issues in teacher education programs (Liston and Zeichner 1991; Zeichner 1993). Grant and Secada (1990), for example, found only 16 studies published between 1973 and 1988 on preservice teacher education related to multicultural education, broadly defined. Knowledge about the worlds that children inhabit, the social contexts influencing schools, and how alliances with families and community promote children's growth and development are among the key aspects of linking children's and teachers' experience, yet these themes typically are glaringly absent from what most teacher candidates have opportunities to learn. Melnick, Gomez, and Price (1990) report that teacher education students also receive very little, if any, of the necessary knowledge and dispositions in their liberal arts courses, although Hixson (1992) notes that this kind of strategy—requiring ethnic studies courses prior to graduation—remains important in states where professional education coursework is minimal.

Special "multicultural education" units or courses developed about particular racial and ethnic groups also fall short in facilitating deepened student understanding. According to McDiarmid and Price (1990), a large proportion of teachers are graduating from programs "believing that prejudging pupils on the basis of their membership in a particular ethnic group is both valid and a legitimate basis for making instructional decisions" (p. 5). Grant (1989) expresses similar reservations about delegating information about culturally diverse learners to one or two selected courses in the teacher education curriculum. Despite the best intentions, what is typically offered in these dedicated "cultural recipe" courses not only fails to alter beliefs that students of color and poor children cannot learn, but often strengthens those beliefs.

Goals of Multicultural Teaching

What dispositions, knowledge, and skills do teachers need in order to address the substantial diversity of the student population? The emerging consensus that is developing a common set of attributes needed to teach ethnic- and language-minority students, regardless of the particular circumstances of specific groups of students, provides a framework of goals for preparing teachers to educate *all* students in this pluralistic population.

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Although teachers will apply these knowledge and skills in different ways, features of successful teaching for poor students of color center on a few key concepts. Zeichner (1996) organizes these features in five areas: high expectations, scaffolding, teacher knowledge, teaching strategies, and assessment and parent involvement.

High Expectations

> High expectations [are] the belief by teachers that all students can succeed, and the communication of this belief to students, by creating a classroom context in which all students feel valued and capable of academic success, where teachers take a personal commitment toward achieving success for all students, and where teachers' faith in the ability of students to succeed is communicated by providing students with academically challenging work. (Zeichner 1996, pp. 140-141)

We must continue to interrogate our assumptions about “who can achieve what” and question concepts such as “underachiever,” “overachiever,” and “slow learner.” Moll (1988) provides the following example of this shift in teachers' expectations among successful teachers of Latino students:

> In contrast to the assumption that working class children cannot handle an academically rigorous curriculum, or in the case of limited-English proficient students, that their lack of English fluency justifies an emphasis on low level skills, the guiding assumption in the classrooms analyzed seemed to be the opposite: that students are as smart as allowed by the curriculum. The teachers assumed the

> children were competent and capable and that it was teachers' responsibility to provide the students with a challenging, innovative, and intellectually rigorous curriculum. (p. 467)

Scaffolding

> Scaffolding [involves] bridging between the cultures of school and home, with the intent to use the scaffolds to help students learn the culture of the school while maintaining identification and pride in the home culture. In scaffolding, supports are constructed for students that enable them to move through related experiences from the home toward the demands of the school. The point here is to allow cultural elements that are relevant to the students to enter the classrooms, and at the same time explicitly teaching of the codes and customs of the schools. (Zeichner 1996, pp. 141-142)

Scaffolding has implications for both pedagogy and curriculum. How can we respect individual students' ways of learning and ways of knowing while not denying them access to the cultural capital they will need to succeed in the wider world? How do we balance our attempts to "change the world" with realistic assessments of some of the school-wise and world-wise skills and strategies students may need to gain entrance into existing systems of structures?

Teacher Knowledge

> In order for teachers to be able to implement the principle of cultural inclusion in their classrooms, they need general sociocultural knowledge about child and adolescent development, about second-language acquisition, and about the ways that socioeconomic circumstances, language, and culture shape school performance and educational achievement. (Zeichner 1996, p. 143)

It is critical that teachers learn the difference between understanding the factors that influence children's development and achievement and limiting their own expectations and teaching efforts with children based on their assumptions about specific characteristics: "Juan's language differences make learning to read more difficult for him and require different teaching strategies" rather than, "He can't read well because he doesn't speak English at home." Similarly: "Marissa's cerebral palsy means that we have to find other ways for her to express her thoughts and feelings than by speaking" rather than, "Children with cerebral palsy really can only handle a very functional educational program."

Teaching Strategies

> A focus on meaning making and content is key. . . . Successful teachers of [ethnic- and language-minority] students create opportunities for students to learn to use, try, and manipulate language, symbols, and information in the service of making sense or creating meaning, though some questions have been raised about the efficacy of some allegedly progressive reciprocal practices. What is clear is that teachers need a wide variety of teaching strategies and practices in order to be able to respond to the varied needs of their students. (Zeichner 1996, pp. 145-146)

Again, teachers need to *attend to* differences in learners' characteristics rather than *exacerbate* these differences in ways which lead to inequitable outcomes—for example, suburban children getting a literature-based reading program whereas urban children get only Distar or, conversely, all children receiving the same reading instruction regardless of their needs, such that students who come to school without some of the prerequisite skills are never able to make them up because those skills are assumed or considered unworthy of instruction.

Teachers need strategies for engaging in constructivist, child-centered pedagogy that does not require a different lesson plan for every student. Multilevel teaching, for example, allows members of the same class to study the same content at different levels. Cooperative learning tasks can be structured to require the skills and participation of a wide range of students, particularly those traditionally silenced or undervalued by classmates in traditional teaching settings and structures.

Assessment and Parent Involvement

> It is argued that teachers need a good understanding of the school community and of how to involve parents and other community members in authentic ways in the school program. The literature clearly encourages teachers to learn about curricular-based assessment practices that are used to understand students' performance in a variety of contexts,

such as student portfolios, checklists and inventories, and notes from teachers' observations. (Zeichner 1996, pp. 146-147)

An understanding of the many contexts within which children live and learn is essential to successful collaboration and communication. Learning to interact with a wide range of parents necessitates expanded teacher repertoires of communication (with nonliterate or non-English speaking parents, for example) as well as a willingness to learn from and involve parents who do not fit the mold of "interested parent" when that is defined as "someone who comes to the PTO meeting and makes cookies for the class party." Assessment practices are needed that recognize multiple intelligences and different ways of being "smart" and that provide multifaceted contextual opportunities for students to demonstrate success and learning.

How Will Novice Teachers Develop These Attributes?

If these five areas—high expectations, scaffolding, teacher knowledge, teaching strategies, and assessment and parent involvement—represent goals for what novice teachers should know, how can teacher education programs go about preparing students in these areas?

Educators such as Haberman (1987) argue for selecting teacher education candidates based on criteria related to their potential ability to be successful cross-cultural teachers. However, most preservice programs use more easily quantifiable criteria such as grade point averages and test scores in their selection decisions (Zeichner 1995). Curricular and instructional strategies—not admissions requirements—are the primary vehicle for providing preservice teachers with the knowledge, skills, and dispositions required for multicultural teaching.

The strategies described in this section are based on Zeichner's (1996) review of the literature and are organized in a framework adapted from Zeichner's that includes developing cultural self-knowledge, developing knowledge of cultural "others," and developing historical, cultural, and subject-matter knowledge.

Cultural Self-Knowledge

Whether through autobiographical writings and reflections or through cultural immersion experiences, one of the central themes in teacher education for diversity is the development of an awareness of one's own cultural identity and cultural frames of reference, and coming to appreciate one's own cultural heritage as distinctive and worthwhile (Zeichner 1996). This experience involves opportunities for students to explore their own values, perspectives, stereotypes, and life story and to examine how those experiences have been structured and shaped by race, class, culture, ethnicity, language, and gender (Cochran-Smith 1997).

Such explorations, most effectively conducted in cohesive cohort groups, are often difficult to facilitate. Tatum (1992) describes students' resistance to having open conversations about race and racism and the strategies she uses to overcome this resistance in her psychology of racism course: creating safe classroom environments, creating opportunities for self-generated knowledge; providing an appropriate developmental model that students can use as a framework for understanding their own process, and empowering students to act as change agents. Other strategies, such as student involvement in readings, text analyses, role-play, simulations, and debate can be found in Garmon (1996), Gomez (1996), Hollins (1990), Valli (1995), and Young (1998).

Teacher beliefs, however, tend to be firm and resistant to change, particularly given the weakness of typical teacher education interventions in overcoming the negative effects of prior socialization (Pajares 1992; Zeichner and Gore 1990). For a number of students, becoming a teacher for diversity would involve profound transformations in long-held assumptions and worldviews. As Nieto (1996) reminds us, an important part of becoming a multicultural teacher is to become a multicultural person.

Knowledge of Cultural "Others"

In locales that are racially, ethnically, and linguistically homogeneous, cultural immersion provides powerful experiences, and case studies, biographies, and literature by and about people outside the majority group are important resources for inquiring and learning about cultural others. These structured learning experiences seem to provide novices with occasions to "experience" and reflect on various aspects of practice, particularly on their assumptions and beliefs about learners and how these influence judgments made in classrooms.

Zeichner (1996) offers examples of teacher educators using case studies and accounts to gain cultural knowledge of others (p. 153):

> Banks (1991) uses case studies (some of which are written by students) in his ethnic studies course at the University of Washington to help his students examine their attitudes and values regarding other groups. Kleinfeld (1992) also offers an example of cases used in a teacher education program to promote intercultural understanding.

> Gomez (1991) helps her language arts students at the University of Wisconsin-Madison reexamine their attitudes toward people of color by having them read various accounts of what it is like for many minorities to live and be educated in the United States.

Various kinds of community field experiences have been successfully organized for preservice education students, intended to address the inadequacies of coursework and intellectual analysis alone by providing first-hand, cross-cultural interactions. Kleinfeld (1998) comments on the power of field experience:

> Intellectual analysis is not enough to prepare teachers for cultural diversity. . . . Teachers need experiences that are emotionally unsettling, that open their hearts as well as their minds. Immersion experiences and field-work in culturally different communities stimulate such emotional responses. (p. 143)

Hilliard (1997) endorses the strategy of gaining knowledge about students' families and communities through practica and internship experiences centered in communities and schools. "The new partnerships between schools and universities," according to Zeichner and Melnick (1996), "are not sufficient for developing the cultural competence needed by today's teachers unless these partnerships also extend to the communities in which the schools exist" (p. 193). Such experiences may vary significantly in the amount of time that students spend in the field, in the association with particular courses, in the degree of structure for preservice students, and in the nature of supervision by representatives of the teacher preparation program. Zeichner and Melnick (1996) describe the kinds of experiences that promote greater novice self-understanding and cultural learning, citing the American Indian Reservation Project at Indiana University as a case example:

> The careful structure of the program in preparing students for the experience, and in monitoring their community work and their reflection about that work through the interactive process of writing and responding to cultural

> reports, is a key feature of this program. The Native Americans who serve as paid part-time consultants in the program to prepare student teachers for the 4-month immersion experience are seen by student teachers as the most valuable part of their preparation. (p. 192)

Field experience is also used in Syracuse University's Inclusive Teacher Education Program, which prepares students specifically to work in heterogeneous, inclusive classroom settings. Students in this program have a wide range of field experiences, including one in which they provide respite care to a student with a disability. Students interact with the child in community settings (the mall, the zoo, the playground) and become involved in understanding the day-to-day challenges presented (and overcome) by children with disabilities and their families. Through their involvement in the child's family and their understanding of the familiar and social contexts within which the child functions, they gain in their understanding of and empathy for a specific child and family. Following this experience, they are much less likely to accept school records or assessments of a child's problems uncritically as being the whole story or even the most useful way of talking and thinking about a child with learning difficulties.

Having the experience is only part of the learning; reflecting on the experience with peers and more-knowing others is an important component of that learning, enabling them to make more informed judgments about what children know, what they can do, and what they are expected to do. For example, at the Consortium of Urban Professional Development and Technology Centers in Texas, teacher education candidates enjoy several opportunities for both simulated and real-world experiences that enable them to know children, parents, and community more closely. At the same time, the program emphasizes reflective inquiry—through stories, personal accounts, observations, audiotapes, and videotapes, for example—as a means to deepen the understandings of what has been observed and experienced, particularly as they relate to culture and schooling (Ligons, Rosado, and Houston 1998).

The most effective field experience programs do more than provide the opportunity of an experience in the community; they involve and draw on the knowledge and understandings of people in that community. For such rich learning experiences to occur also requires the presence and involvement of committed teacher educators, who help students make connections to learning in school and university settings. Real community-based learning has to be carefully structured, guided, and facilitated—offering regular opportunities for students to process what they are looking for, what they are experiencing, and what they think they have seen. Rios, McDaniel, and Stowell (1998), in attempting to account for preservice students' growth on a continuum of affective taxonomies, point to the dynamic interaction of university, college, program, and community components. No one experience seems sufficient.

Historical, Cultural, and Subject-Matter Knowledge

Learning about the histories, participation, and contributions of different racial and ethnic groups is another avenue for learning about "cultural others" and for developing greater multicultural education competency. The importance of culturally relevant teaching, and the ways in which teachers' greater understanding of students' backgrounds might promote student learning, are addressed by numerous authors (e.g., Au and Kawakami 1994; Burstein and Cabello 1989; Delpit 1988; Hale-Benson 1988; Heath 1983; Irvine 1992; Ladson-Billings 1994; Noordhoff and Kleinfeld 1993). Grant (1997) argues for extension of teacher education knowledge to include not just traditional, mainstream knowledge but the experiences of previously excluded groups. He calls upon teacher educators to focus their attention on issues related to the structure of knowledge and its relationship and connection with issues of race, class, gender, power, and privilege. Hilliard (1997) emphasizes the systematic study of history and culture. Ellwood (1990) makes the case for an ethnic studies component in teacher education programs:

> If student teachers studied linguistics long enough to understand that say, an African-American dialect is as rule bound and linguistically sophisticated as the dialect which has gained prominence as "standard American English," they may be less inclined to judge their students as unintelligent simply because they speak a different dialect. If they also studied Afro-American history and literature, gaining an appreciation for the immense love of language running through African-American culture, they might be able to recognize in their own black students, skills and linguistic strengths that could be built upon in the classroom. (p. 3)

Including these subjects does not mean relegating them to separate courses, but integrating and infusing them in regular features of the teacher preparation program. Given the differences in backgrounds between teachers and children, and the unfamiliarity of preservice teachers with their students, we know that we cannot leave it for teacher candidates to pull these ideas together for themselves. Researchers from the Texas Consortium make similar observations with regard to gender awareness and other aspects of diversity:

> Consortium stakeholders recognize that prospective teachers are not born with innate abilities to spot the nuances related to gender; they must be taught about the research and theoretical constructs that undergird diversity and its manifestations in classroom interactions. Furthermore, they need to have contact with students from diverse backgrounds and to experience differences and respond to them. Last, small groups need to work together so their perceptions are sharpened by the ideas of others. (Ligons, Rosado, and Houston 1998, p. 139)

Not only are there potential cultural mismatches between teacher and learner and between school and home, but students' different learning styles require different teaching styles, and students' requirements for particular cultural knowledge vary. In order to generate multiple representations, metaphors, and connections for students, preservice teachers must also develop deep understandings of subject matter (Grant 1997). Similarly, researchers call for preservice teachers gaining experience with successful teachers in successful school settings in order to apprentice examples of best practice with culturally diverse students.

Generic or Multicultural Knowledge?

Many would answer the question of what preservice teachers should know with the statement that "good teaching is good teaching," whatever the context, and that a fervent application of "generic" teacher education would serve all students equally well. This group, described by Smith (1998) and others as "genericists," include those who believe that—

> no special knowledge and skills other than the mainstream, traditional knowledge bases of teacher education are needed to train teachers for classrooms of students from culturally and linguistically diverse backgrounds. In short, genericists believe that if the teachers they train would only work as vigorously and intensely with non-White minority, culturally diverse, and poor White students through the regular curricula of the elementary and secondary schools as they do with White middle-class students, these teachers would deliver high-quality education and the perplexing,

> historical problems of "underachieving" students from culturally diverse minority and poor White groups would be solved. . . . What the genericists really mean when they say "good teaching is good teaching" is that good teaching for white middle-class students is also good teaching for all students without any consideration given to factors of race, culture, social class, gender, and other significant aspects of diversity. (p. 17)

Smith contrasts this typically race-blind and culture-blind perspective with that of "multiculturalists," those who do not believe it is possible to create models of good teachers without taking issues of culture and context into account (e.g., Cole and Griffin 1987; Delpit 1988; Zeichner 1996):

> Multiculturalists, and reconstructionists . . . hold that generic teacher training is not sufficient. That is, they assert there really is a body of special knowledge, skills, processes, and experiences that is different from the knowledge bases of most traditional teacher education programs and that is essential for preparing teachers to be successful with culturally and linguistically diverse student populations. They also assert that learning how cultural variables interact with other variables of diversity such as race, gender, social class, special needs, and sexual orientation is of primary importance in the education of teachers. These culturally responsive teacher educators believe that culture deeply influences the way children perceive and go about school learning and that the more a teacher understands the cultures and other aspects of diversity of the students in a classroom, the more likely the teacher can provide a classroom context that will result in a successful, high-quality education for culturally and linguistically diverse students. (Smith 1998, pp. 17-18)

Smith offers an example that may help to clarify the distinctions between these two views:

> The traditional knowledge base on classroom management and discipline studied by preservice teachers in generic teacher education programs has value only if its applicability is examined in the cultural context of, say, African American children in inner-city schools, Mexican American children of working immigrant parents in a rural school, or Native American students in a reservation school. That is, if a particular model of classroom management is inconsistent with the child's cultural belief system

> and community context, the model is likely to have limited value. Thus culturally responsive teacher educators believe one of the major elements missing from generic teacher education programs is the examination of the traditional knowledge bases in a variety of cultural contexts. (p. 18)

The two camps—"genericist" and "multiculturalist"—represent polar positions in a fundamental debate among teacher educators in regard to an appropriate teacher education curriculum to prepare novices to teach an increasingly diverse student population, and the distance between their positions is wide. Even though the views vary significantly, members of each camp ardently believe that they are being responsive to the needs of their students. Although the generic models of effective teaching can contribute to effective teaching of children of color, little from the multiculturalist view currently seems to permeate mainstream teacher education. For example, references to works by educators and researchers regarding the linguistic minority child's acquisition of standard English are largely absent from the textbooks used in undergraduate courses in literacy and foundations courses (Smith 1998). Needless to say, the prevailing view informs the nature and substance of the curricular offerings and experiences made available to preservice teacher candidates.

Teacher education programs need to help novices understand the importance of both models and learn to bring them together. It is possible, for example, to reframe the statement that "good teaching is good teaching" to mean that good teaching always takes into account students' backgrounds, experiences, and cultural contexts. Good teaching can be defined in such a way that it includes the very kinds of skills that those promoting high-quality multicultural education espouse—for example, choosing reading materials for all students that reflect their interests, experiences, and backgrounds and yet also stretch them beyond those boundaries; or accepting that *all* students need to feel accepted and respected within the classroom environment and that good teaching demands that teachers know enough about their students to create a safe and nurturing classroom community.

Multicultural Teacher Education Literature: Three (Complementary) Perspectives

Even within the "multiculturalist" teacher education viewpoint, diverse perspectives are offered. Following are brief summaries of three major reviews of the research on culturally relevant teacher education that have been conducted in the last 10 years: Sleeter and Grant (1988), Zeichner (1996), and Ladson-Billings (1995). These particular reviews of the multicultural education literature were selected for their comprehensiveness and for their focus on teacher preparation. The similarities and differences in perspectives offered by these reviewers signal a range in goals, expectations, and target population on the one hand, and lack of consensus within the field on the other.

Approaches Addressing Human Diversity Issues

Drawing upon their review of more than 200 articles and 60 books written on multicultural education, Sleeter and Grant (1988) organize the literature around five approaches to addressing issues of human diversity (race, culture, language, gender, social class, and exceptionality) in the classroom. Their intent was to assist educators in understanding their own definitions and purposes for multicultural education and multicultural teacher education in schools and in society. Five approaches, related to specific goals, are represented in this literature review:

- **Teaching the exceptional and the culturally different**: to help fit people into the existing social structure and culture (p. 35)
- **Human relations**: to promote positive feelings among students and reduce stereotyping, thus promoting unity and tolerance in a society composed of different people (p. 75)
- **Single-group studies**: to reduce social stratification and raise the status of a particular group (p. 105)
- **Multicultural education**: (1) to promote the strength and value of cultural diversity, (2) to promote human rights and respect for those who are different from oneself, (3) to promote alternative life choices for people, (4) to promote social justice and equal opportunity for all people, and (5) to promote equity in the distribution of power among groups (pp. 137-138)
- **Education that is multicultural and social reconstructionist**: to promote social structural equality and cultural pluralism (p. 175)

The articulation of five approaches provides an important way for institutions to look at the nature of their own approach to multicultural education. It should be recognized, however, that Sleeter and Grant do not consider these five approaches to be equally effective in bringing about social justice. Rather, they place them on a continuum ranging from those which leave existing social and cultural hierarchies largely untouched to those which attempt actively to change social structures to make them more equitable. This continuum may be useful to teacher education institutions that want to examine their program's stance relative to multicultural education and social justice.

Strategies Promoting Teacher Attributes for Cross-Cultural Teaching

Zeichner's (1993) comprehensive literature review on teacher education for diversity describes various approaches and themes related to what teachers need to be like, know, and be able to do to be successful in cross-cultural teaching. At the same time, these themes mask deep disagreements about how to develop among preservice teachers the knowledge and dispositions to extend powerful learning to every child. Immersion and practicum experiences in school and communities serving racial, ethnic, and language-minority students is one important theme in this literature. Other key instructional strategies for "teacher education for diversity" proposed by Zeichner's review include the following:

- Screen students for admission on the basis of cultural sensitivity and a commitment to the education of all students, especially poor students of color who frequently do not experience success in school.
- Help students to develop a clearer sense of their own ethnic and cultural identities.
- Help students to examine their attitudes toward other ethnocultural groups.
- Teach students about the dynamics of prejudice and racism and about how to deal with them in the classroom.
- Teach students about the dynamics of privilege and economic oppression and about school practices that contribute to the reproduction of societal inequalities.
- Address, in the teacher education curriculum, the histories and contributions of various ethnocultural groups.
- Give students information about the characteristics and learning styles of various groups *and* individuals and teach them about the limitations of this information.
- Give attention in the teacher education curriculum to sociocultural research knowledge about the relationships among language, culture, and learning. Teach students various procedures by which they can gain information about the communities represented in their classrooms.

- Teach students how to assess the relationships between the methods they use in the classroom and the preferred learning and interaction styles in their students' homes and communities.
- Teach students how to use various instructional strategies and assessment procedures sensitive to cultural and linguistic variations and how to adapt classroom instruction and assessment to accommodate the cultural resources that their students bring to school.
- Expose students to examples of successful teaching of ethnic- and language-minority students.
- Have students complete community-field experiences with adults and/or children of another ethnocultural group with guided reflections.
- Have students complete practicum and/or student teaching experiences in schools serving ethnic- and language-minority students.
- Provide opportunities for students to live and teach in a minority community (immersion).
- Embed instruction in a group setting that provides both intellectual challenge and social support.

Derived from one of the most comprehensive reviews of the literature on preparing teachers for diversity, these strategies indicate important dispositions and skills for teaching children from a range of social, cultural, and linguistic backgrounds, and they suggest how development of these attributes these might be accomplished. It should be noted that each strategy as presented here represents a major theme in Zeichner's review, and the brief descriptions provided here do not begin to convey the rich discussions in which these ideas are embedded. Nonetheless, such a listing could provide a useful tool in program and course design and evaluation. For example, it could form the basis of a rubric for examining specific teacher education programs in terms of whether and where each attribute is addressed, how its achievement is assessed, who is responsible for the content, and so on. Such an evaluation could help faculty determine (1) whether these attributes are evenly or consistently addressed throughout the program or limited to a particular course on "Multicultural Education"; (2) how faculty who are engaged in such teaching can educate and support one another and garner support from other faculty; and (3) how students view these offerings within their own programs and the extent to which this focus contributes to their success in teaching and/or willingness to seek employment in settings which include extensive diversity.

Dimensions of Multicultural Education

"Culturally relevant teaching," according to Ladson-Billings (1994), is a way to empower "students intellectually, socially, emotionally, and politically by using cultural referents to impart knowledge, skills, and attitudes" (pp. 17-18). In her review of the multicultural teacher education literature (1995), she argues for the direct and two-way relationship between issues of teacher education in general and multicultural teacher education in particular. She draws upon Banks's five-dimension typology of multicultural education—including content integration, knowledge construction, prejudice reduction, equity pedagogy, and empowering school culture and social structure—as a way to organize recent work in multicultural teacher education:

- **Content integration** deals with the extent to which teachers use example, data, and information from a variety of cultures and groups to illustrate key concepts, principles, generalizations, and theories in their subject area or discipline.
- The **knowledge construction** process describes the procedures by which social, behavioral, and natural scientists crate knowledge and how the implicit cultural assumptions, frame of references, perspectives, and biases within a discipline influence the ways that knowledge is constructed within it.
- The **prejudice reduction** dimension of multicultural education describes the characteristics of children's racial attitudes and strategies that can be used to help students develop more democratic attitudes and values.
- An **equity pedagogy** exists when teachers use techniques and methods that facilitate the academic achievement of students from diverse racial, ethnic, and social-class groups.
- An **empowering school culture and social structure** . . . describe the process of restructuring the culture and organization of the school so those students from diverse ethnic groups will experience educational equality and cultural empowerment. (Banks 1993, pp. 5-7 cited in Ladson-Billings, 1995 p. 752 [bullets added])

Using this typology to organize the results of her ERIC search of studies from 1988-1992 (using the descriptors *multicultural education* and *teacher education*), Ladson-Billings reported on 43 studies. She found that most of the attention in the literature focused on "content integration"—reasons for and studies of content integration. As with Zeichner's review, each of these dimensions represents rich research and discussion in which these ideas are embedded. Ladson-Billings also looks to the "wisdom of practice" to provide additional sources, sites, and opportunities to further develop multicultural teacher education experiences. She reports the increased use of autobiography, restructured field experiences, situated pedagogies, and examinations of classroom practices of successful teachers in diverse classrooms.

Design Principles: What Should Teacher Education Programs Do, and How?

Preparing novice teachers to be successful teachers of diverse learners is not about specific methods, or checklists, or superficial information about specific cultural groups. The kinds of understandings that we want to develop among novices are far more complex—rooted in the realities of classroom, school, family, and community life, and cognizant of the values, practices, and larger issues of curriculum and school purpose.

Zeichner, Grant, Gay, Gillette, Valli, and Villegas (1998) draw from the comprehensive research literature to offer a set of design principles for multicultural preservice teacher education that (1) emphasize issues of institutional and programmatic reform, (2) address issues related to staff and students, and (3) focus on issues of curriculum and instruction in teacher education programs. This set of principles extends the focus beyond individual courses to consider both the institutional contexts in which the program is offered and student admissions policies. Fourteen design principles are organized into three categories: institutional and programmatic principles, personnel principles, and curriculum and instruction principles.

Institutional and Programmatic Principles

- The mission, policies, and procedures of the institution reflect the values of diversity and multicultural education.
- The institution is committed to multicultural teacher education.
- The teacher education program is a living example of multicultural education.

Personnel Principles

- Admission requirements to teacher education programs include multicultural as well as academic criteria.

- Faculty, staff, and supervisors are committed to and competent in multicultural teacher education.

Curriculum and Instruction Principles

- Multicultural perspectives permeate the entire teacher education curriculum, including general education courses and those in academic subject matter areas.
- The program fosters the understanding that teaching and learning occur in sociopolitical contexts that are not neutral, but are based on relations of power and privilege.
- The program is based on the assumption that all students in elementary and secondary schools bring knowledge, skills, and experiences which must be used as resources in teaching and learning, and that high expectations for learning are held for all students.
- The program teaches prospective teachers how to learn about students, families, and communities, and how to use knowledge of culturally diverse students' backgrounds in planning, delivering, and evaluating instruction.
- The program helps prospective teachers reexamine their own and others' multiple and interrelated identities.
- The program provides carefully planned and varied field experiences that explore sociocultural diversity in schools and communities.
- The program helps prospective teachers develop the commitment to be change agents who work to promote greater equity and social justice in schooling and society.
- The program teaches prospective teacher how to change power and privilege in multicultural classrooms.
- The program draws upon and validates multiple types of sources of knowledge.

These design principles represent one vision of good practice in multicultural teacher education. It is a vision that touches all parts of the teacher education experience: institution, personnel, program, curriculum, and instruction. It is a vision that asks key questions: Who are the students in our teacher education programs? Who are the students in our public school classrooms? and What are they to learn, and how are they to learn it? This vision points a way for teacher educators to begin work.

Conclusion

The growing diversity among U.S. schoolchildren coupled with the increasing cultural and linguistic homogeneity of novice teachers argues for deeper attention in teacher preparation programs to preparing novices for the children they will teach. Zeichner (1996) describes an emergent literature that provides us with goals related to developing the knowledge, dispositions, and skills needed for culturally relevant teaching—including high expectations, scaffolding, teacher knowledge, teaching strategies, and assessment and parent involvement. Developing one's own cultural identity; developing an understanding of others' cultural identity; having opportunities to develop historical, cultural, and subject-matter knowledge; and learning how to integrate ideas of good teaching with understandings of children's diversity are general strategies to approach those goals.

As defined in the introduction to this volume, contextual teaching enables learning in which students employ their academic understandings and abilities in a variety of out-of-school contexts to solve simultated or real-world problems. This is what we are asking of novice teachers: to connect understandings of subject matter, practice, learners, and context in order to make complex judgments in the real world of classrooms and schools. Our hopes for teachers' learning mirror our hopes for children's learning—opportunities for scaffolded learning and meaning making, connecting ideas across contexts; infusion of cultural knowledge throughout the curriculum; learning alone and with others, with opportunities for experience and reflection; and having high expectations for success.

For teacher education candidates, contextual teaching and learning would regularly draw on the knowledge of people in universities, people in schools, and people in communities. Although each makes an important contribution, the greatest benefit is derived from the connections across all three domains. Community field and immersion experiences, for example, are powerful when facilitated and guided by members of that community in alliance with university faculty. Reflections on classroom internship experiences are made all the more rich when school and university faculty participate in the conversation. When participation expands—for example, through real-life experiences or through cases—perspectives expand. It is this wider range of experience that enriches the preparation of teacher education candidates.

The stance taken throughout this discussion, rather than offering specific content material or particular pedagogical methods for working with particular diverse groups, is one "grounded in the concept of generative abilities"—preservice teachers learning how to learn (Murrell and Diez 1997). There is no one model program or practice that can address the wide variation in classrooms and contexts that our preservice students may encounter. The various conceptual frameworks highlighted here illustrate both the commonalities and the range of perspectives on preparing teachers to offer high-quality instruction to culturally diverse students. Children are diverse in multiple ways, and what we should hope for, I would argue, are teachers who learn in their teacher education programs how to learn from their own students and communities, and how to make good judgments in the service of the full growth and development of all the children they will teach.

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Recommended Reading

Banks, J. A. (1993). "Multicultural education: Historical development, dimensions, and practice." In Linda Darling-Hammond (Ed.), ***Review of research in education, 1993***. Washington, DC: American Educational Research Association.

Through a historical view, Banks presents a broad review of several bodies of research and theory that inform the field of multicultural education. In the editor's view, "Banks traces the evolution of ideas, concerns, and proponents through the many stages of multicultural thought leading to today's conceptions of multicultural education as encompassing the influences of race, ethnicity, class, gender, and exceptionality on curriculum and children's educational opportunities" (p. xiii).

King, J. E., Hollins, E. R., and Hayman, W. C. (1997). ***Preparing teachers for cultural diversity***. New York: Teachers College Press.

This collection of essays describes how teachers can be prepared to support all the students they teach, grounded in principles of social justice, high standards, and social communities.

Nieto, S. (1996). ***Affirming diversity: The sociopolitical context of multicultural education. 2d ed***. White Plains, NY: Longman Publishers.

Nieto's treatment is a rich and thoughtful presentation and analysis of 12 students' stories and how they inform a broad conceptual framework of multicultural education.

Sleeter, C. E., and Grant, C. A. (1988). ***Making choices for multicultural education: Five approaches to race, class, and gender***. Columbus: Merrill Publishing Co.

In this comprehensive review of the literature addressing race, culture, language, gender, social class, and disability, Sleeter and Grant describe five approaches to multicultural education and the goals, theories, practices, and consequences for students and society suggested by each approach.

Theory into Practice, 1998, 37, (2).

This themed issue focused on "Preparing Teachers for Cultural Diversity" provides a research-informed vision of good practice in multicultural teacher education and articles intended to exemplify these design principles.

Zeichner, K. (1996). "Educating teachers for cultural diversity." In K. Zeichner, S. Melnick, and M. L. Gomez (Eds.), ***Currents of reform in preservice teacher education*** (pp. 113-175). New York: Teachers College Press.

The Role of Self-Regulated Learning in Contextual Teaching: Principles and Practices for Teacher Preparation

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How can educators strengthen the relevance and meaningfulness of what is taught and learned in schools? Borko and Putnam (in this volume) point to widespread concern that teachers and schools are failing to help children acquire the knowledge, skills, and dispositions that are crucial for life outside school and in the workplace. Our challenge is how to make the learning in schools more authentic, more useful, and more contextualized so that students are equipped to solve real life problems both during and after school. How can we connect schools to real life contexts or situations so that all students are successful once they leave the classroom? How can we prepare students to be autonomous, strategic, and motivated for all future life roles and for self-regulated, lifelong learning?

Contextualized learning and teaching are approached from various perspectives in this volume:

- The social-constructivist perspective on cognition that emphasizes distributed and collaborative learning
- Problem-based teaching as a means of fostering inquiry about issues that integrate the curriculum and apply students' knowledge
- Service learning as a means for connecting schools to community needs

- Work-based learning as a means of linking students to the world of work
- Culturally relevant pedagogy as a key factor in bridging the cultural gap between teachers and their students
- Authentic assessment as a meaningful gauge of learning and enhancing student motivation

There are common threads among these approaches. Each seeks to make school more relevant to the outside world, each offers strategies that increase students' understanding about the application rather than the accumulation of knowledge, and all are compatible with and provide opportunities for self-regulated learning. It seems clear, from our perspective, that teachers need to provide instruction across a greater variety of contexts, incorporate a wider set of perspectives, and implement a more extensive set of instructional strategies than has traditionally been the case; and in doing so, they need to be much more thoughtful and reflective about their teaching and about their students.

> “Teachers need to understand their own thinking to become more effective in nurturing the thinking of their students.”

This paper examines self-regulated learning as a means of helping students become more autonomous, strategic, and motivated for future life roles and for lifelong learning. Teachers need to understand their own thinking to become more effective in nurturing the thinking of their students. When new teachers have acquired an understanding of the social and situated nature of learning, an appreciation of the importance of authentic contexts, the habit of reflecting upon their own experiences, and the willingness to question their own assumptions and beliefs, then they will be better prepared to create the kinds of learning climates that will enable students to learn lessons that really matter. This view is consistent with the recommendations of a special Committee on the Teaching of Educational Psychology, created by Division 15 of the American Psychological Association, which advocated that future teachers use a psychological perspective on learning to create a coherent framework of ideas about student learning (Anderson, Blumenfeld, Pintrich, Clark, Marx, and Peterson 1995). They argued that deeper understanding of the cognitive, motivational, and situated characteristics of learning can help teachers design better instruction.

We will examine the conceptual foundations of self-regulation; its relationship to metacognition, motivation, and related constructs of contextual teaching and learning; and the benefits to teachers who become more knowledgeable about metacognition and engage in effective self-regulation. Next, we will propose some principles of self-regulation and discuss how they can be put into practice both in the instruction of students and in the preparation of teachers, using an existing teacher preparation program as an example. Finally, we will consider obstacles to implementation as well as future directions for self-regulated learning.

What Is Self-Regulated Learning?

McCombs and Marzano (1990) define self-regulated learning as "the outcome of choosing to engage in self-directed metacognitive, cognitive, and behavioral processes and skills" (p. 52). Jones, Valdez, Nowakowski, and Rasmussen (1995) provide a description of engaged learners that captures key aspects of self-regulated learning:

> Engaged learners are responsible for their own learning. They take charge and are self-regulated. They define learning goals and problems that are meaningful to them; have a big picture of how specific activities relate to those goals; develop standards of excellence; and evaluate how well they have achieved their goals. They have alternative routes or strategies for attaining goals—and some strategies for correcting errors and redirecting themselves when their plans do not work. They know their own strengths and weaknesses and know how to deal with them productively and constructively. Engaged learners are also able to shape and manage change. (p. 7)

The term *self-regulated learning* became popular in the 1980s because it underscored students' emerging autonomy and their responsibility to take charge of their own learning. As a general concept, it incorporated research on cognition, metacognition, and motivation into one coherent construct that emphasized the interplay among these forces. It also emphasized the "self" as the agent in establishing learning goals and strategies and acknowledged the influence of the individual's perceptions of self and task on the quality of learning that ensued. In the past decade, several themes have emerged in self-regulated learning research: its connections with constructivism (see, for example, Paris and Byrnes 1989); its social foundations (see Pressley 1995; Zimmerman 1989); its developmental aspects (e.g., Paris and Newman 1990); and instructional strategies for self-regulated learning (Butler and Winne 1995). The integrative nature of self-regulated learning has stimulated researchers to study broader and more contextualized issues of teaching and learning while also examining the value of self-regulated learning as an educational objective at all grade levels. Interested readers can trace the history and various theoretical orientations to self-regulated learning in a volume by Zimmerman and Schunk (1989).

What is important for teacher educators is that self-regulated learning is a contextual teaching and learning approach that is inherently motivating for the student; that involves the teacher as facilitator, guide, and co-learner rather than the traditional dispenser of information (Jones et al. 1995); that is useful in group settings as well as with individual learners; and that is especially germane to out-of-classroom contexts such as workplace and community settings. Prospective teachers who develop self-monitoring and self-management skills will be better able to use this approach in helping their students become autonomous, strategic, and motivated learners. In this brief overview, we focus on three central characteristics of self-regulated learning: awareness of thinking, use of strategies, and sustained motivation.

Awareness of Thinking

Becoming self-regulated involves awareness of effective thinking and analyses of one's own thinking habits. This is metacognition, or thinking about thinking, which Flavell (1978) and Brown (1978) first described. They showed that children from 5-16 years of age become increasingly aware of their own personal knowledge states, the characteristics of tasks that influence learning, and their own strategies for monitoring learning. Paris and Winograd (1990) summarized these aspects of metacognition as children's developing competencies for self-appraisal and self-management and discussed how these aspects of knowledge can help direct students' efforts as they learn. This discussion emphasized that the educational goal was not simply to make children think about their own thinking, but rather to use metacognitive knowledge to guide the plans they make, the strategies they select, and their interpretations of their performance so that awareness leads to effective problem solving. This view is consistent with that of Bandura (1986) who asserted that self-regulation involves three interrelated processes; self-observation, self-evaluation, and self-reaction. Understanding these processes and using them deliberately is the metacognitive part of self-regulated learning.

Use of Strategies

A second part of self-regulated learning involves a person's growing repertoire of strategies—for learning, studying, controlling emotions, pursuing goals, and so forth. It is important to recognize that the concern here is with "being strategic" rather than "having" a strategy. It is one thing to know what a strategy is and quite a different thing to be inclined to use it, to modify it as task conditions change, and to be able to discuss it and teach it.

There are three important metacognitive aspects of strategies, often referred to as *declarative knowledge* (what the strategy is), *procedural knowledge* (how the strategy operates), and *conditional knowledge* (when and why a strategy should be applied) (Paris, Lipson, and Wixson 1983). Understanding these characteristics of strategies can help students to discriminate productive from counterproductive tactics and then to apply appropriate strategies. When students are strategic, they consider options before choosing tactics to solve problems and then they invest effort in using the strategy. Their choices of strategies embody self-regulated learning because such choices result from cognitive analyses of alternative routes to problem solving.

Sustained Motivation

The third characteristic of self-regulated learning is motivation, because learning requires effort and choices. McCombs and Marzano (1990) discuss the need for a focus on "the self as generator of will and motivation to engage in self-regulatory learning processes and activities" (p. 52). Paris and Cross (1983) argue that ordinary learning fuses skill and will together in self-directed actions. Self-regulated learning involves motivation-related decisions about the goal of an activity, the perceived difficulty and value of the task, the self-perceptions of the learner's ability to accomplish the task, and the potential benefit of success or liability of failure. Awareness and reflection can lead to a variety of actions depending on the motivation of the person. According to McCombs and Marzano (1990), "interventions must bridge and link self and cognitive system functions. This bridge involves metacognitive awareness and understanding as the path to helping students display the *will* and develop the skills for self-regulation" (p. 52).

Self-regulated learning has been characterized as a positive set of attitudes, strategies, and motivations for enhancing thoughtful engagement with tasks, but students can also be self-directed to *avoid* learning or to minimize challenges. When students act to avoid failure instead of pursue success, attribute their performance to external or uncontrollable forces, use self-handicapping strategies, or set inappropriate goals, they are undermining their own learning. These behaviors are self-regulated but may lead to diminished effort, task avoidance, and other actions that decrease engagement and learning. Learned helplessness, apathy, and defiance may also be counterproductive motivational responses to learning that can be overcome with better understanding of self-regulated learning. In our view, teachers need to understand students' motivation in order to understand how they learn, what tasks they choose, and why they may display persistence and effort or, conversely, avoidance and apathy. Self-regulation thus implies "personalized cognition and motivation" (Hickey 1997) that exemplifies behaviors which may or may not be consistent with the teacher's agenda for learning. Because teachers need to be diagnostic about their students' learning styles and orientations, it is helpful to analyze students' awareness, use of strategies, and their motivation.

It is important to note that this view of self-regulated learning does not conflict with Borko and Putnam's (in this volume) view of cognition as situated, social, and distributed. They argue, and we agree, that to understand knowledge and learning, we need to better understand the importance of contexts, social relationships, collaboration, and cooperation. *Self*-regulated learning does not mean that knowledge and learning exist solely in the mind of an individual. Rather, self-regulated learning recognizes that individuals have some control over their own learning, across contexts, across relationships, and across situations. Teachers who use a psychological lens to analyze students' strategies, motivation, and attitudes gain deeper understanding about students' behavior in the classroom. This understanding in turn allows them to design better instruction that can make learning more meaningful for them.

The roles of the student and the teacher in self-directed learning are summarized in the following table.

Student	Teacher
• Takes charge of own learning. • Defines learning goals and problems that are personally meaningful. • Derives motivation from meaningfulness of the goals, investment in the process, and engagement in learning. • Considers options and selects primary and alternate strategies for achieving goals. • Is aware of and monitors own thinking processes and continually develops and refines learning and problem-solving strategies. • Produces (as opposed to reproducing) meaning or knowledge and applies and transfers knowledge to solve problems creatively. • Uses reflective thinking as a means of refining cognitive approaches and transferring knowledge. • Participates in developing and using assessments to evaluate own progress.	• Provides a learning environment that promotes self-regulated learning. • Creates opportunities for self-directed activities, collaborative work, and sharing of knowledge. • Guides the student in learning how to learn. • Serves as facilitator and guide. • Models, mediates, and coaches, adjusting the level of support to the student's needs. • Helps the student link new information to prior knowledge. • Helps the student refine problem-solving strategies. • Actively listens, questions, provides feedback, and helps the student refocus when needed.

Why Is Self-Regulation Important for Teachers?

Understanding and developing the capacity for self-regulation is important for several aspects of teaching: problem solving, reflective practice, understanding of students, and ability to model self-regulated learning.

Problem Solving

Understanding the notion of self-regulation is important for teachers because teaching requires problem solving and invention. Teachers face problems and challenges that are complex and rarely straightforward. As Schön (1987) points out, teaching teachers facts and rigid decision-making models is less effective than nurturing within teachers the capacity and skills to deal with the difficult problems of the real world. It is ironic that teachers are often taught with pedagogical methods that are contrary to the principles that they are being taught—for example, using direct instruction to teach problem-based learning or cooperative learning. Corno and Randi (1997) advocate giving teachers the same contexts, challenges, and choices that are beneficial for students, and we wholeheartedly agree. Their "collaborative innovation" model of professional development involves teachers working together to adapt, invent, evaluate, discuss, and revise instruction that fits their own classrooms and contexts, including such factors as students, time, buildings, resources, accountability pressures, and parents. In our view, collaborative innovation provides opportunities for teachers themselves to become self-regulated, strategic, and motivated as they devise instructional and assessment methods which mimic the processes of collaborative innovation they want their students to discover and create. Collaborative innovation is a professional development model of the co-construction of meaningful experiences.

Reflective Practice

One of the most well-known approaches to providing teachers with both capacity and skills to be innovative is reflective practice (see Dewey 1933; Liston and Zeichner 1987; Schön 1983, 1987, 1991). Although definitions vary, in general terms reflective practice refers to the teacher's ability to engage in active, persistent analysis of his or her beliefs and knowledge and the consequences that follow from those beliefs and knowledge. Ross (1990), for example, defined reflection as a way of thinking about educational matters that involves making rational choices and assuming responsibility for those choices. Ross goes on to say that the elements of reflective practice include—

- recognizing educational dilemmas;
- responding to a dilemma by recognizing both the similarities to other situations and the unique qualities of the particular situation;
- framing and reframing the dilemma;
- experimenting with the dilemma to discover the implications of various solutions; [and]
- examining the intended and unintended consequences of an implemented solution and evaluating it by determining whether the consequences are desirable. (p. 99)

Ross's definition incorporates the earlier work of Dewey (1933), Schön (1983), and Liston and Zeichner (1987) by emphasizing the importance of requisite attitudes—such as introspection, open-mindedness, and a willingness to accept responsibility—and requisite attributes, such as teachers' values and moral structure. These attitudes and attributes are part of teachers' implicit pedagogical theories that are manifested in their practices. Clearly, teachers' attitudes, attributes, and understandings will influence the kinds of student difficulties they will recognize, how they will interpret and diagnose those difficulties, and what judgments they will make about the desirability of various solutions.

Schön (1991) poses several questions about reflective practice that are important for teachers to consider:

- What is it appropriate to reflect on?
- What is an appropriate way of observing and reflecting on practice?
- When we have to take the reflective turn, what constitutes appropriate rigor?
- What does the reflective turn imply for researchers' stance toward the educational enterprise—the subjects, the research activity, and researchers themselves?

These are key questions with complex answers. We believe that the conceptual framework of self-regulated learning provides an important perspective that is useful in addressing these four questions. Understanding the concept of self-regulated learning enhances a teacher's ability to be reflective because self-regulated learning provides insights into the issues of teaching and learning—particularly those which arise when teachers are faced with the challenge of connecting their teaching and the students' learning to the real world. Knowing more about their own thinking, developing effective strategies, and sustaining their own motivation will be crucial for teachers interested in making schooling more relevant to the outside world.

Understanding of Students

By combining the notions of contextual teaching and self-regulated learning, teachers gain a deeper understanding of the learning experiences that face their students. Teachers have a better sense of what those experiences entail, what obstacles need to be overcome, and what teaching or learning strategies will be called into play. For example, Wade (in this volume) argues that much of the value in service learning comes from the changes in students' ability to question their own thinking, assumptions, and motivations. One of the driving questions about service learning is how to set up community experiences that foster greater student understanding of and involvement in meaningful civic participation.

Modeling

The better that teachers understand their own thinking, the better they can model self-regulated learning for students. Understanding self-regulation can help teachers make thinking public and visible. Thinking—strategic, independent, and inquisitive—then becomes a topic of classroom discussion and an explicit goal of education.

Understanding the nature of self-regulation and how it is nurtured opens up a world of possible roles and relationships between teachers and students. That is why metaphors of teaching as coaching and mentoring are popular today: they emphasize how teachers design and scaffold experiences that lead students to emulate the wisdom of teachers.

Principles and Practice

When self-regulated learning is used in preparing new teachers to use contextual teaching, it can help them better understand themselves as thinkers and thereby make them better able to develop for students a metacognitive curriculum that is thought provoking and stimulating. In this section, we explore several principles that underlie the use of self-regulated learning in K-12 education and in teacher preparation as well as strategies for putting them into practice. Together these principles and strategies provide a useful set of guidelines for incorporating self-regulated learning into the curriculum.

1. **Self-appraisal leads to a deeper understanding of learning.**
   - A. Analyzing personal learning styles and strategies, and comparing them with those of others, increases awareness of different ways of learning.
   - B. Evaluating what you know and what you do not know, as well as discerning your personal depth of understanding about key points, enables you to allocate effort more efficiently.
   - C. Periodic self-assessment of learning processes and outcomes promotes monitoring of progress, stimulates repair strategies, and promotes feelings of self-efficacy.
2. **Self-management of thinking, effort, and affect promotes flexible approaches to problem-solving that are adaptive, persistent, self-controlled, strategic, and goal oriented.**
   - A. Goal setting is most effective when the goals are chosen by the individual and when they embody a mastery orientation rather than a performance goal.
   - B. Managing time and resources through effective planning and monitoring is essential to setting priorities, overcoming frustration, and persisting to task completion.
   - C. Review and revision of one's learning approach may indicate self-monitoring and a personal commitment to high standards of performance.
3. **Self-regulation can be taught in diverse ways.**
   - A. Self-regulation can be taught directly, through explicit instruction, directed reflection, and metacognitive discussions.
   - B. Self-regulation can be promoted indirectly by modeling and through activities that entail reflective analyses of learning.
   - C. Self-regulation can be promoted by assessing, charting, and discussing evidence of personal growth.
4. **Self-regulation is woven into each individual's narrative experience and identity.**
   - A. How individuals choose to appraise and monitor their own behavior is usually consistent with their preferred or desired identity.
   - B. Gaining an autobiographical perspective on education and learning provides a narrative framework that deepens personal awareness of self-regulation.
   - C. Collaborative reflection enhances one's self-regulation habits both in frequency and in depth.

1. Self-appraisal leads to a deeper understanding of learning.

A key aspect of metacognition is the periodic appraisal of one's thinking. This appraisal is useful for students and teachers alike because it provides an opportunity for reflection on the dynamics of teaching and learning and serves as a first step toward changing or revising one's approach. Self-appraisal enhances learning by increasing awareness of ways of learning, allowing more effective targeting of one's own learning efforts, and contributing to feelings of self-efficacy by keeping learning strategies on target for successful outcomes.

A. Analyzing personal learning styles and strategies, and comparing them with those of others, increases awareness of different ways of learning. Students who become aware of their own learning styles—the ways they learn best—will be better able to regulate their own learning by using strategies that are consistent with those styles. Learning styles have been categorized in various ways. Feden (1994), for example, identifies four types of learners (p. 23):

- innovative learners—learners who need to be given a reason to learn analytical learners—learners who need facts and information
- common sense learners—learners who need to try things out and see how they work
- dynamic learners—learners who like to go beyond the information given and engage in self-discovery

Consider the implications for a work-based project involving setting up a business, for instance. An innovative learner might be motivated by the prospect of using a student-run business to fund a desired school/social event or address a perceived problem. An analytical learner might need a prefatory research phase, learning alternative business theories before committing to an approach. A common sense learner might want to plunge right in, using trial and error and making adjustments along the way. A dynamic learner might use the business project as a springboard for exploring management styles.

Clearly, students who are given options in how they will study, pursue learning goals, and solve problems need to be able to make appropriate choices: effective strategies that both promote significant learning and are appropriate for their learning styles. Students who are encouraged to become aware of their learning styles and to examine the learning strategies they use will be better prepared to make these choices. Teachers need to be aware of their students' learning styles in order to ensure that the students have an appropriate range of options from which to choose.

Prospective teachers can assess their own learning styles and strategies by examining the processes they use to solve problems or write papers, the tactics they use to search for information in the library or on the Internet, or their methods of studying for tests. Because these activities are similar to the tasks their future students will face, teachers need to become aware of their own learning strategies and compare them to other approaches. For example, in writing a paper, do they use notes or develop outlines before writing? Do they revise once, many times, not at all, or throughout the writing process? Do they ask friends to read early drafts, or are they reluctant to share their writing? Teachers need to become aware of a wide range of strategies, not just their own, so that they can create situations in which their students will discover a range of strategies.

Teachers also need to understand the nature of learning strategies—for example, that they are often unexamined and often difficult to change; that a particular strategy may be easy for a student but produce only superficial learning whereas another more challenging strategy may produce deeper, more significant learning. Teachers who with their peers go through the process of explaining, discussing, and justifying their own strategies may be better able to understand their students' learning strategies—why they choose particular strategies, why they create or adopt poor learning strategies and are reluctant to give them up, why they become entrenched in poor learning habits, how they cultivate new strategies.

B. Evaluating what you know and what you do not know, as well as discerning your personal depth of understanding about key points, enables you to allocate effort more efficiently. Perhaps the most surprising finding from early metacognitive research is that children often are unaware of what they do not know (Markman and Gorin 1981) and unable to distinguish important from unimportant information (Baker and Brown 1984). Either they fail to reflect on what they do not understand or mistakenly assume that things make sense when they do not. This is precisely why periodic self-appraisal is useful, and it applies to teachers as well. Teachers may fail to discern their own understanding, sometimes following a teacher's manual or prescribed lesson plan so carefully that they fail to ask whether it makes sense to them, whether all the information is necessary to teach, or whether they could present the material in a more sensible way.

How can teachers learn to judge their own knowledge state in a contextualized manner? The following approaches illustrate simple ways that novice teachers can be guided to incorporate knowledge evaluation into their teaching.

- While preparing a lesson, teachers can evaluate the lesson to distinguish between the important information and information that is secondary. This may be done simply by highlighting or, more profitably, by developing a summary that can then be used with students. Providing such a summary not only helps the students identify key information but also models the use of summarizing to check understanding.

- Teachers can evaluate lessons to identify any parts that are confusing to them so that they can devote more effort to these parts and avoid providing superficial or erroneous information to students.
- Teachers can ask other teachers to review their lesson plans and ask them questions, prompting them to assess their own level of understanding and to provide warrants for their teaching.
- Teachers can establish "critical friends" within the school or the district who are trained to offer meaningful peer assessment. This arrangement provides a safe environment for peers periodically to review each others' lesson plans, observe teaching, and provide feedback. Review criteria and comments can be specifically targeted to depth of content knowledge as well as effectiveness and appropriateness of learning strategies.

C. Periodic self-assessment of learning processes and outcomes promotes monitoring of progress, stimulates repair strategies, and promotes feelings of self-efficacy. Research on children's reading has shown that they rarely stop as they read a passage to determine if it makes sense, if their rate of reading is appropriate for understanding the material, or if they need to reread (Winograd and Paris 1989). Rather, they tend to read from start to finish and then—at the end—are perplexed if they cannot answer the teacher's questions. When children fail to monitor their comprehension, they may erroneously attribute poor performance to low ability rather than to their failure to read strategically, and they may feel ashamed of their reading instead of proud. The same thing occurs among adult learners. For example, college students who procrastinate and then have enough time to write only a single draft of a paper are apt to feel relief that the paper is done rather than pride in what has been produced. Their lack of self-regulation, their failure to plan and monitor, produces little sense of accomplishment or self-efficacy and thus diminishes their view of themselves as learners. How can teachers use self-assessment to improve their (and their students') ability to self-monitor?

Teachers can practice comprehension monitoring with each other during joint reading. For example, using the reciprocal teaching technique developed by Palincsar and Brown (1984), teachers can take turns as the "student" reading or the "teacher" asking questions. This strategy demonstrates the value of periodic monitoring for teachers and is directly replicable in the classroom. Students can be paired for joint reading, taking turns in each role, or peer tutors can use joint reading as a strategy for helping other students with their comprehension skills.

Another contextualized strategy is to review progress on long-term projects periodically during the activity (rather than simply evaluating them at the end) so that the learning strategies being used can be reviewed and, if necessary, revised during the construction of the activity. This approach has the advantage of both causing the student to think consciously about the learning process and helping to ensure their success. At the end, teachers should explicitly discuss with students the learning strategies that contributed to successful completion of the project and encourage students to take pride in their use of those strategies.

2. Self-management of thinking, effort, and affect promotes flexible approaches to problem solving that are adaptive, persistent, self-controlled, strategic, and goal oriented.

Self-regulated learning cannot be reduced to a list of steps or a menu of options; it involves learners' dynamic actions when engaged in complex problem solving. Therefore, management of resources, including time and collaboration with others, must be negotiated and renegotiated in relation to one's available strategies, motivation, and affect. Self-regulated learners do not simply follow a plan of action; they adapt to changing conditions and know what to do when they encounter problems. It is the flexible response to unforeseen circumstances that typifies self-regulation: self-regulated learners do not lose sight of their goals or lose positive perceptions of themselves when things do not unfold as planned.

A. Goal setting is most effective when the goals are chosen by the individual and when they embody a mastery orientation rather than a performance goal. Jones et al. (1995) assert that self-regulated learners "define goals and problems that are meaningful to them; have a big picture of how specific activities relate to those goals; develop standards of excellence; and evaluate how well they have achieved their goals" (cited in Brown and Pritz, in press). When goals are set by others, behavior is apt to be compliant or obedient rather than self-directed. However, setting goals that are personally meaningful, attainable, challenging, and mastery oriented is difficult for children. For example, children often set performance goals such as "I will work harder" or "I will read more books" (which denote activity not learning) rather than mastery goals that get at conceptual understanding and deep learning. When goal setting promotes performance instead of mastery, self-regulated learning is actually undermined (Anderman and Maehr 1994).

Another problem children sometimes have with goal setting is that they often choose unattainable or distant goals such as "I'll be the best reader in class" or "I'll get all As on my report card." Such goals, which often are stated to appear virtuous rather than to provide a realistic guide or standard, tend to go unmonitored or simply to be forgotten.

Unfortunately, adults are sometimes unaware of the difficulties children encounter in setting meaningful goals. Prospective teachers can develop a better understanding of these difficulties by engaging in the goal-setting process themselves. For example, at the beginning of a course, the instructor might ask teachers to list their goals for the course and then discuss them in small groups. This exercise can be used to point out differences between proximal vs. distal goals, attainable vs. unattainable goals, and performance vs. mastery goals. Furthermore, such discussion can be structured to examine whether the goals represent guides for the student (as opposed to high aspirations intended to impress or please others), to provide constructive comparisons between deep and shallow approaches to goal setting, and to demonstrate the value of setting mastery goals at a challenging standard.

B. Managing time and resources through effective planning and monitoring is essential to setting priorities, overcoming frustration, and persisting to task completion. Children need abundant practice in self-regulated learning to become proficient at it. Thus, teachers need to provide a variety of opportunities for them to practice making choices and establishing priorities. Some teachers worry that children will make poor choices if given too much freedom, but clever teachers know how to organize the environment so that all choices are acceptable. Children can be allowed to select their own books, choose their own project topics, and design extension activities for language arts, science, or math from a prescribed set of books, topics, or activities. For example, for a service learning project, the teacher might establish project parameters and preselect a number of service sites, then allow students to choose a site and work out project goals and activities in conjunction with the onsite sponsor.

Similarly, children need to practice setting priorities for their own work for the day or the week so they learn how to distinguish between essential and nonessential tasks, how to set reasonable goals in relation to available time, and how to pace themselves to ensure completion of the task. To foster students' awareness of available resources, teachers may need to challenge them to check the available time in relation to assignments so they can plan their work wisely and monitor their progress. Teachers can also have students plan a schedule for homework and for projects to give them practice organizing their own schedules. It is important to introduce planning early. If done in the early grades, students will be better prepared when they reach middle school to do the independent planning and prioritizing that is needed to handle the workload for multiple teachers and courses.

Teachers need to reflect on how they make and follow plans, how they set priorities, and how they persist at tasks despite distractions if they are to teach children to do likewise. Corno (1993) refers tothese tactics as "volitional strategies" because people need to have action-based strategies that connect intended plans with desired goals. Teachers' management strategies are seen daily by their students; if teachers are disorganized, it encourages children to be disorganized too. Teachers can model good planning through the use of planning tools (such as day planners, monthly reminders, wall calendars, lists, and so on) and planning processes (for example, prioritizing competing demands on their time and dealing with plans gone awry). Teachers who resist acting angrily to frustration and failure and instead exhibit a constructive response help students learn dynamic problem solving and effective resource management.

C. Review and revision of one's learning approach may indicate self-monitoring and a personal commitment to high standards of performance. Failure is an obstacle to self-regulated learning when learning stops and low ability is the perceived reason for failure. John Holt's (1982) ***How Children Fail*** detailed many ways in which children close down their thinking and withdraw from teachers and learning. Failure is defined by students and teachers within classrooms in different ways, and Clifford (1991) suggests that we teach students to think of "constructive failure." This approach recognizes that everyone fails, and the stigma is removed when students realize that it is the *response to failure*, not failure itself, that is important. The self-regulated learner analyzes why learning did not occur as planned and then revises the approach to eliminate the problem. This approach exhibits both flexibility and persistence, and it signals the individual's high personal standards and a mastery orientation. When a task is completed or an obstacle is encountered, the self-regulated learner is willing and able to analyze the approach and the outcome and to begin again, building constructively on either the success or the failed attempt.

Teachers need to understand how different students react to failure, how they interpret failure, and why they are (or are not) willing to start over; it is not just high or low motivation that is at issue here. Feelings of efficacy and positive expectations can lead a student to examine possible causes for failure, to invent new approaches, and to persist until the goal is reached. To better empathize with students, teachers need to have experienced failure themselves. One approach to ensuring that they gain this experience is to set up exercises in which some participants will perform poorly and to require them to explain their performance and what they will do differently next time. Such activities show that failure is common and not necessarily an indication of low personal ability. They can help desensitize the teacher to failure, preventing a withdrawal response and encouraging the teacher to seek alternative solutions. Such exercises, in which failure is explicitly addressed, examined, and used as a means to improve learning strategies can also be replicated with youngsters in the classroom. Practice, experience, and modeling by teachers can promote self-management of a wide range of self-regulated learning strategies in their students.

3. Self-regulation can be taught in diverse ways.

Self-regulated learning can be taught to both children and adults. This does not mean that all learning must be self-regulated nor that everyone must be taught self-regulation in the same way. Just as teaching begins with the learner and not the curriculum, self-regulated learning begins with the learner and not with a list of strategies. Because self-regulated learning is flexible and adaptive, different kinds of strategies and motivation can be emphasized for different learners according to their needs. Good teachers will include components of self-regulated learning in what they teach and expect of their students, and wise teachers will adapt their methods of instruction to the learner.

A. Self-regulation can be taught directly, through explicit instruction, directed reflection, and metacognitive discussions. Cognitive research has shown that expertise can develop in many ways and explicit instruction is not always necessary. However, many children do not gain metacognitive insights or use self-regulated learning effectively without some direct instruction, and it seems plausible that teachers also can increase their own metacognitive understanding through explicit instruction.

The most direct method of making new teachers aware of self-regulated learning is to incorporate it in the curriculum as a topic of study. Teacher education courses in educational psychology can present background information on the research and theory that undergirds self-regulated learning. Teachers can then use their knowledge of self-regulated learning to create thoughtful activities for students in subject matter areas such as science, math, and language arts. The key is to identify the metacognitive understanding and self-regulation strategies that are desired and expected of students at each grade level and then to find ways to engage students periodically in thinking about their own learning.

For example, Du Bois and Staley (1997) describe an educational psychology course designed to help preservice teachers understand self-regulated learning and incorporate it into their teaching. The course provides explicit information about four self-regulated learning topics—meta-cognition, cognitive strategies, academic motivation, and volition—so that students can study the research and theory that provides the foundation for self-regulated learning. The course also includes a five-phase model of self-change (Prochaska, Di Clemente, and Norcross 1992) that helps students become aware of self-regulation strategies and eventually to implement and sustain them. The five phases—precontemplation, contemplation, preparation, action, and maintenance—embody the same kinds of emerging awareness and control that we have described as metacognitive self-appraisal and self-management. The course provides opportunities for students to be reflective through journals, strategy analysis, and group discussions. Moreover, the instructors teach "strategy orchestration" through "contextualization," which helps students connect motivation to strategy use through modeling, guided peer questioning, and self-evaluation, all processes that are similar to those we have described throughout this chapter. Teachers who engage in these kinds of activities in teacher education classes are more likely to understand self-regulated learning, perceive the value of self-regulated learning, and teach self-regulated learning to their students.

B. Self-regulation can be promoted indirectly by modeling and through activities that entail reflective analyses of learning. Self-regulated learning can be taught indirectly by means of classroom activities—such as journals, conferences, and literacy portfolios—that evoke reflection and metacognitive understanding, and through activities that allow the student to learn through the creation of learning itself.

Journals are an excellent vehicle for reflection because they can be used with students of any age. Prospective teachers who use journals in their own classes learn to distinguish superficial entries and responses from analytic entries and responsive comments. Thus they are less likely to "do journals" as an activity for their students and more likely to use journal writing as an avenue for self-exploration, self-discovery, and self-disclosure.

Conferences are another tool that translates easily from teachers to students. Whether conferences are focused on cooperative projects, report cards and grades, planning and brainstorming, or other classroom events, they can include analyses of thinking, learning, and teaching.

In Paris and Ayres' (1994) study, teachers who implemented literacy portfolios in their elementary classrooms reflected on the usefulness of the portfolios throughout the year. They gauged children's reactions to the organization and management of the portfolios, questioned what work samples to include, and made adjustments to their classroom portfolios to ensure that children used them appropriately. Not only did teachers model reflection for students but, conversely, children provoked teachers to reflect on their instruction. Teachers who listened to children discuss their journals, their progress, and their learning were stimulated to reflect on the effectiveness of their portfolios and to change them as needed.

Activities that put the student in the "driver's seat" in terms of setting goals, selecting a course of action, and monitoring and assessing progress not only provide opportunities for students to practice self-regulation but to learn how to self-regulate their learning more effectively. Following are examples.

- Problem-based learning fosters an inquiry-based approach to learning that is student driven in terms of both motivation and approach. A student might, for example, use an environmental problem as the focus for learning about biological concepts.
- A service learning project, such as establishing a "reading pals" program at a senior center, can enable the student to extend the context for learning beyond the classroom and to learn from experience in the community. The student regulates learning by establishing learning goals, planning and implementing the project, and analyzing and reporting on the experience. Guided reflection activities can be designed to address metacognitive and cognitive issues as well as community factors.
- Projects that require the student to work with people from other ethnocultural groups, either within the school or in the community—for example, a high school student managing a

play group at a homeless shelter, or a teacher teaming with culturally different peers to develop an interdisciplinary unit—encourage learners to examine and challenge individual and societal assumptions about those groups. Again, guided reflection is crucial in helping the students thoughtfully examine both their assumptions and their cognitive processes.

- Work-based strategies demonstrate the connections between subject matter and the work place and teach students to apply knowledge at work and in other nonschool environments. For example, a student wanting to learn about a particular career might research local employers, develop interview questions, identify opportunities for job shadowing, shadow one or more workers on the job, and analyze and report on the experience.
- Activities that cast the student as teacher put the student fully in charge of what is learned and engage the student in motivation, goal setting, construction of concepts, resource management, and assessment.

Student as teacher provides an excellent example of a self-regulated learning activity that uses an indirect approach to developing the capacity to self-regulate learning. This approach may involve the student in directing his or her own learning or in teaching others, as occurs with peer tutoring, mixed age ability groups, or teaching a lesson to the entire class. VanDeventer (1997) describes the primary rationale for using the student as teacher strategy:

> When students are actively engaged in the construction of learning it is believed that greater conceptual understanding and enhanced skill development can occur. Students must give greater thought to the design, presentation and construction of concepts and ideas if they are involved as active deliverers of content and information. Research in constructivism indicates that this may result in effects such as enhancing long- and short-term memory, introducing metacognitive processes, developing problem-solving skills, and encouraging organization, research and logical thought processes. (p. 111)

C. Self-regulation can be promoted by assessing, charting, and discussing evidence of personal growth. Assessments of growth, like journals and conferences, promote reflection on progress and learning. Self-regulated learning can be promoted through keeping records of goals met, grades received, and progress made in behavior management and learning. This simple technique (often used to monitor personal endeavors such as diet, exercise, or budget) can easily be extended to academic performance. Students who monitor their own progress can use the information to evaluate and revise their learning strategies. Teachers who use such records will gain a better understanding of how periodic self-appraisal can lead to feelings of pride or to renewed efforts.

Portfolios may be the best example of an assessment tool that promotes self-regulated learning. If teacher education courses used these more frequently and in more conceptually driven ways, they would help prospective teachers understand how portfolios promote students' reflections, not just collections. Ideally, portfolios should span more than one course and one semester so that teachers can see the changes that occur over time during their professional preparation.

4. Self-regulation is woven into each individual's narrative experience and identity.

Lave and Wegner (1991) assert that learning is situated in domains of expertise and social interactions that they label "legitimate peripheral participation." One of their central points is that learning is part of a person's narrative story, both a cause and consequence of their identity. They provide examples of tailors, midwives, and recovered alcoholics who learn the skills of their group, attain the identity of the group, tell their own "war stories" like the group, and regulate their own behavior according to the identity of the group. In this view, self-regulated learning is shaped by the identity of the group one belongs to or aspires to join. Although what is learned depends on the group identity, *how* it is learned, according to Lave and Wegner, is similar across people and groups because it hinges on participation through apprenticeship that gradually moves to full membership.

A. How individuals choose to appraise and monitor their own behavior is usually consistent with their preferred or desired identity. Children become students when they move into formal schooling, but they gain other identities throughout their educational career, especially from age 12 on. Sometimes these identities are evident in labels ("geek," "brainiac," "burnout," "gangsta") and sometimes they are more covert, evident only by participation in activities of the group—whether consistent with teacher's educational goals or not. What this means is that students use self-regulated learning for different ends, depending on their identities. If they believe that getting good grades is inappropriate for their group, they may eschew effective self-regulated learning techniques such as doing homework planfully. If their identity is consistent with a college-bound or intellectually curious person, then they may engage appropriately in positive aspects of self-regulated learning.

What does this mean for teachers? Too often teachers are unprepared to work with students who have backgrounds substantially different from their own. They need to consider how students' identities influence the likelihood that they will be responsive to self-regulated learning. For example, teachers who are sensitive to multicultural values and nonacademically oriented families may understand why some students actively avoid deep engagement in school whereas others embrace it. Role playing and frank discussions with ethnically and socially diverse peers may enhance teachers' understanding of students who have identities that are different from their own, helping them to understand how their peers as well as their students might resist traditional learning strategies and motivational appeals but might work diligently for other types of self-regulated learning that are consistent with their identities, groups, and aspirations.

B. Gaining an autobiographical perspective on education and learning provides a narrative framework that deepens personal awareness of self-regulation. Throughout this paper we advocate teachers' reflecting on their own learning and teaching experiences in order to achieve insight into their thinking and pedagogy. One excellent reflection strategy is for teachers to create an educational autobiography in which they trace the influences on their education as a means of understanding their own longitudinal development. The autobiography should include family influences, favorite teachers, and "turning point" experiences, as well as personal recollections of special aptitudes, choices of majors and careers, and identification of preferred learning and teaching styles. Creating an autobiography not only helps prospective teachers understand their own development but prepares them to use similar exercises with their own students to build self-awareness.

C. Collaborative reflection enhances one's self-regulation habits both in frequency and in depth. Reflection is not an isolated activity of introspection followed by brilliant insights. Indeed, reflection is often redundant and unproductive in terms of producing insights. Reflection must be an ongoing, iterative process in which thinking and learning are reconsidered whenever conditions, knowledge, and experience change the ways we interpret our mental lives. Other people can provide valuable impetus and guidance for reflection because they stimulate us to see thinking in new ways and from new perspectives. This is why collaboration in a community of scholars is vital both to children's intellectual development and to teachers' professional development (Brown and Campione 1990).

How can teachers participate in collaborative reflection? One method is to review teaching videotapes together. For example, two teachers might videotape each other and then discuss what they were trying to achieve and to what extent it was effective. They might also discuss issues of metacognition and self-regulated learning: What metacognitive techniques did the teacher build into the lesson plan? What did the teacher model? How did the teacher conduct metacognitive conversations and encourage students to think about thinking while simultaneously covering the curriculum material? Peer conferences about teaching that focus on self-regulated learning can explore how to create the self-regulated learning focus in daily activities, how to elicit student conversations, and how to talk about it with another professional teacher.

A second approach to collaborative reflection is revealed in the internship programs established in teacher education programs in which master or mentor teachers help beginning teachers reflect on their instructional content and pedagogical styles. In these programs, mentors provide nurturance and guidance for new teachers by—

- Observing and comparing their professional development with that of others
- Sharing "war stories" and personal narratives
- Supporting them with motivational encouragement, such as reassurance that the problems they encounter can be solved
- Promoting their professional identities as teachers

Mentors can provide "inside" or expert advice about self-regulating strategies that they have discovered and used so that their practices are passed on as a legacy of proven self-regulated learning tactics for teachers and students. It is the participation with peers that builds a professional identity which, in turn, motivates new teachers to adopt effective self-regulated learning habits.

Self-Regulated Learning, Contextual Teaching, and Teacher Preparation: An Example

A teacher preparation program at the University of New Mexico provides a useful illustration of how a teacher education program can help new teachers become more aware of their own teaching and learning. The program is built on the understanding that a partnership between the university and the public school provides a more meaningful context for teacher preparation and development than do more traditional models of teacher preparation. In addition, this program emphasizes the importance of social relationships in learning to become a teacher. Finally, the program focuses heavily on helping the teachers become more aware of their own learning so that they can better help their students succeed.

The Context

The Albuquerque Public Schools, the Albuquerque Federation of Teachers, and the University of New Mexico have developed a partnership aimed at developing a system of recruiting, preparing, and supporting teachers throughout their careers. The partnership is a collaborative effort that provides systematic opportunities for university faculty to work with classroom teachers, counselors, and administrators in the preparation and support of teachers. The partnership includes programs that focus on the recruitment of diverse groups (including educational assistants) into teacher education; mentoring preservice teachers in a variety of programs, including Professional Development Schools; providing induction support to new teachers; and developing networks and support for advanced professional development. In addition, the partnership sponsors initiatives in bilingual education, literacy, counseling, and educational technology.

Instructional Strategies

For the purpose of this paper, we will focus on the work of the student teachers (referred to as novice teachers) in the partnership's Professional Development Schools (PDS), which are located at two school sites in Albuquerque. The teacher preparation curriculum is organized around four critical questions:

1. Who am I as a teacher?
2. Who are the children I am teaching?
3. What comprises the school community?
4. How do I connect my emerging knowledge of self, children, and community to content understandings?

During their year-long involvement in the PDS program, novice teachers engage in a number of projects aimed at exploring these four critical questions. The projects most related to self-regulated learning and contextual teaching include the following:

- *Teaching Autobiography*, which helps novice teachers understand their assumptions about teaching and learning and clarify the values and beliefs they bring to the classroom.
- *Philosophy of Teaching*, aimed at capturing the novice teachers' emerging ideas about teaching and learning and helping them to articulate the rationale behind their instructional practices.
- *Reflective Journal*, which provides a place where the novice teachers and their mentors can exchange ideas about teaching in a safe and thoughtful way.
- *Community Study*, in which novice teachers develop a systematic understanding of what it is like to be a child in the school and what it means to connect the community context to children's learning.
- *Child Study/Kid Watching Project*, a collaborative effort between the mentor and the novice teacher. The novice teacher observes and documents two children as they develop over the course of a year.
- *Teaming to Teach*, which requires novice teachers to work collaboratively with each other in order to gain a deeper understanding of what it takes to transform content for different learners, to use a variety of curricula, and to be part of a team.
- *Community Service*, which connects the novice teachers to the authentic needs of the school, to small groups of students, and to the broader community.

Consider how these instructional activities can enhance the novice teacher's ability to engage in the four principles of self-regulated learning discussed earlier.

1. **Self-appraisal leads to a deeper understanding of learning.** The novice teachers in the partnership program have systematic opportunities to engage in self-appraisal by thinking about themselves as teachers, about their approach to teaching, and the experiences they are having as they go through the PDS program. In addition, there are structured opportunities to discuss these self-reflections with others in their cohort.

2. **Self-management of thinking, effort, and affect promotes flexible approaches to problem solving that are adaptive, persistent, self-controlled, strategic, and goal oriented.** Such projects as the reflective journal, the community study, the child study, and teaming to teach provide the novice teachers with opportunities and structure aimed at helping them develop more flexible, strategic, and effective approaches to problem solving. Because these instructional tasks take place over the entire length of the

PDS program, the novice teachers are able to see how their knowledge and thinking changes over time.

3. **Self-regulation can be taught in diverse ways.** The variety of instructional tasks, including direct and indirect instruction, mentoring, autobiography reflective journal, kid watching, community study, and others helps ensure diversity of opportunities for self-regulation and reflection consistent with a variety of learning styles.
4. **Self-regulation is woven into each individual's narrative experience and identity.** Opportunities for autobiographical examination, collaborative reflection, and shared journal writing promote a greater understanding of how one's identity (their own and those their peers and their future students) influences one's approach to self-directed learning and help to strengthen the teachers' habits of self-reflection.

The Professional Development Schools programs have been evaluated in relation to a number of criteria, including how well the new teachers know their students, how well they know their subject matter, how they work with colleagues and constituencies, and how they participate in the working of a good school. The results indicate that the new teachers perform well in all of these areas. In addition, the feedback from hiring principals is very positive, particularly in relation to the students' understanding of themselves as teachers and their ability to provide clear and articulate rationales for their curricular choices and strategies. Understandably, the evaluations also indicate that there are areas that need to be strengthened—such as the need for students to develop deeper understandings of child development, educational foundations, multicultural education, and educational technology.

In summary, this partnership demonstrates how instructional strategies that foster and enhance self-regulated learning can be incorporated into teacher preparation programs. It is important to note, however, that such strategies are only a beginning. There is a clear need for more extensive use in teacher preparation programs of contextualized learning strategies of the types discussed in other papers in this volume. There are also some obstacles and concerns that must be addressed if we are to make real progress in helping teachers connect students to authentic learning experiences beyond school.

Obstacles and Concerns

Although it is exciting to think about ways that self-regulation can be embedded in teacher preparation programs, it is important to be realistic about the challenges that must be addressed if our vision of teachers who are adept at self-regulated learning is to be turned into widespread practice in the classroom.

The first major obstacle is the uneven and often inadequate preparation that teachers receive. The National Commission on Teaching and America's Future (NCTAF 1996), for example, states that only 500 of the nation's 1,200 teacher preparation programs meet common professional standards. In addition, NCTAF estimates that more than 12 percent of all newly hired teachers enter classrooms without any preparation at all, and another 15 percent enter the classroom without fully meeting state standards. Uneven or inadequate preparation leads to a host of problems—among them that poorly prepared teachers are more likely to engage in perfunctory curriculum delivery rather than engage in thoughtful self-regulation.

A second, related, problem is the difficulty of strengthening existing teacher preparation programs that are adequate but are locked into rigid frameworks of discrete courses that have minimal correlation and integration. Often there are limits on the number of credit hours that students can take before graduation or certification. Professors from different disciplines feel that students never get enough preparation in their particular areas, and in too many cases they are correct. Developing a teacher preparation curriculum that expects teacher candidates to engage in self-regulated learning and that provides real support and opportunities for thoughtful activities is no small feat. It would seem that, in most institutions across the country, teacher educators are struggling to manage large numbers of students on tight budgets with short timelines. Expecting such programs to become more concerned about nurturing the intellectual growth of individual students may not be realistic until and unless fundamental changes are implemented in the ways that teacher preparation programs are organized and supported.

The situation in teacher preparation is likely to worsen as the nation experiences a predicted increase in demand for new teachers. According to various estimates, student enrollments will grow to 54.3 million students by 2007, up from 50 million students in 1995. Combine this increase with the fact that large numbers of current teachers are nearing retirement, and it becomes clear why experts are predicting that the nation will need to hire at least 2 million new teachers in the next 10 years. What this means is that the number of poorly prepared or unprepared teachers is likely to increase unless teacher preparation programs are changed in significant ways.

Strengthening the way teachers are prepared is crucial but it is only part of the solution. The NCTAF, for example, argues that schools must be reorganized for student and teacher success. It offers a number of recommendations in this regard, including one that is particularly relevant to self-regulated learning: that schools rethink schedules and staffing so that students have more time for in-depth learning and teachers have more time to work with and learn from one another. This recommendation is crucial, inasmuch as most elementary teachers currently have only 8.3 minutes of preparatory time, and high school teachers have just 13 minutes, for every hour they teach.

Our final concern has to do with the nature of the curriculum that teachers are expected to teach and that students are expected to learn. If we really want teachers and students to engage in self-regulated learning, then classroom curriculum must be organized in ways that support and value autonomous inquiry and strategic problem solving. The good news is that the right language often shows up in many of the national and state efforts to develop learning standards and goals. For example, the performance standards developed by the New Standards project focus on the importance of helping students learn problem-solving strategies and self-management techniques. The National Educational Goals Panel (http://www.negp.gov) describes eight national education goals defined by the Governors and the Congress to improve learning and teaching in the nation's educational system. Part of Goal 3, Student Achievement and Citizenship, is that "every school in America will ensure that all students will learn to use their minds well, so that they may be prepared for responsible citizenship, further learning, and productive employment in our Nation's modern economy." The bad news, however, is that our paltry support of innovative curriculum development and our reluctance to make real changes in our high-stakes assessment systems will result in students and teachers continuing to focus on low-level kinds of learning. We face the fundamental question: Can we really change curriculum and assessment systems in ways that support thoughtful teachers and students who can deal with complexity, or will those systems continue to foster the illusion that life—like the tests we give—has only one correct answer?

> "If we really want teachers and students to engage in self-regulated learning, then classroom curriculum must be organized in ways that support and value autonomous inquiry and strategic problem solving."

Recommendations

We have argued that teachers need to become aware of self-regulated learning, become models of effective strategies, analyze their own students' learning, and implement classroom activities that contextualize learning. Following are recommendations for helping teachers and students become more self-regulated learners.

1. We strongly endorse the recommendations of the National Commission on Teaching and America's Future, particularly those dealing with standards for teachers and students, reinventing teacher preparation and professional development, recruiting and retaining qualified teachers, and creating schools that are organized for student and teacher success.
2. Teacher preparation programs must become a higher priority for universities in general and colleges of education in particular. We have models of teacher preparation programs that provide new teachers with rich curriculum and powerful mentoring relationships, but these are labor intensive and expensive. Using these models to prepare a larger proportion of new teachers will require universities and colleges to rethink their priorities.
3. Courses on pedagogy need to be designed and taught that focus on teaching and learning strategies that promote self-regulated learning for both teachers and students.
4. Educators need to do a better job of communicating with the public, policymakers, and other stakeholders about the nature of teaching and learning. We need to build a solid base of support among parents, legislators, the media, the business community, and other influential citizens for the importance of teacher preparation and the profession of teaching.

The potential in current teacher education reform movements is exciting, but our enthusiasm must be tempered with an appreciation for the realities of the issues we face. Solving the pedagogical issues in teacher preparation will be easier than solving the political and economic issues. Our ability to make progress depends on our ability to think clearly about the challenges, to imagine a better world for our children, and to stand firm for those things we value.

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Authentic Assessment of Teaching in Context

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This paper addresses authentic assessment practices in preservice teacher education programs, paying particular attention to how authentic assessment practices support contextualized teaching and learning. By authentic assessment we mean efforts to evaluate—in ways that include or simulate actual acts of teaching—how prospective teachers are developing the knowledge, skills, and dispositions that will inform their practice. These "acts of teaching" include planning for teaching, the process of reflecting on teaching and learning in which teachers must engage to build curriculum and shape instruction, and the activities through they interact directly with students.

Our reference to contextualized teaching and learning is meant to underscore the fact that all teaching and all learning is shaped by the context in which it occurs and defined by the nature of the subject matter, the goals of instruction, the individual proclivities and understandings of learners and teachers, and the setting within which teaching and learning take place. The elements of that setting include the school organization, available resources and materials, the amount of time allotted for teaching and learning and how it is structured for learning, the duration and nature of relationships among students and teachers, community norms and values. The extent to which context influences teaching—and the extent to which it determines what kinds of approaches to teaching will be effective—is a factor that is just beginning to be acknowledged in research on teaching, teacher education, and assessment of teaching.

Over the past decade, many teacher education programs, along with organizations such as the National Board for Professional Teaching Standards (NBPTS), have been engaged in developing authentic assessments of contextualized teaching and learning. They are finding that cases, portfolios in which artifacts of practice are assembled, exhibitions of performance, action research projects, and problem-based inquiries help capture important attributes of teaching and reasoning about teaching in ways that teachers find more valid and useful than commonly used examinations featuring multiple-choice responses to canned scenarios or problems (Darling-Hammond, in press). These tools allow the application of theoretical principles to problems in specific contexts while appropriately complicating efforts to draw generalizations about practice. A small but growing body of research suggests that such tools can often deepen teachers' understanding of the many variables that influence their work and its effectiveness. Teachers claim that the act of engaging in assessments requiring analysis of the interconnected components of teaching and its effects ultimately enriches their ability to understand the complexities of classroom life and makes them better able to meet the needs of diverse students (Athanases 1994; Bliss and Mazur 1997; Bradley 1994; Darling-Hammond, in press; Haynes 1995; Ingvarson and Marrett 1997; Tracz, Sienty, Todorov, Snyder, Takashima, Pensabene, Olsen, Paul, and Sork 1995).

In this paper, we describe how several authentic assessment tools that are currently being used in different teacher education programs help prospective teachers develop an appreciation for the many factors that influence learning and build a repertoire of teaching strategies that, collectively, help a greater number and range of students learn more productively. We present evidence from a collection of recent case studies, conducted by the National Commission on Teaching and America's Future, of extraordinary teacher education programs, as well as evidence about other programs that was recently reported in the literature. Beyond our descriptions of these approaches—each of which is widely used in many other teacher education programs—we examine how the nature of the assessment strategy appears to shape the kinds of learning experienced by prospective teachers.

A Rationale for Contextualized Assessment of Teaching

The complexity and diversity of teaching and learning in today's schools tax the understanding of veteran and novice teachers alike. As student populations grow more diverse and expectations for student learning grow more ambitious, formulaic approaches to teaching that fail to allow for the different experiences and needs of students are becoming less and less successful. Teachers who want to be successful with all learners must deal with the different resources each student brings to the table, including different dispositions, prior experiences and knowledge, cultural and linguistic capital, and sources of potential identification and opposition.

An increasingly diverse student population and the introduction of new content standards for student learning have brought about increased curricular complexity. Standards such as those of the National Council of Teachers of Mathematics, which are now incorporated into many states' and districts' curriculum frameworks, introduce greater cognitive demands as they press for deeper understanding and for students to become proficient in ways of applying knowledge that are far more complex than the rote recall of facts and algorithms. This kind of learning in turn demands teaching that is more unpredictable because it is more dependent on the teacher's capacity to understand and capitalize on student thinking and manage the complex, idiosyncratic process of knowledge construction in which each learner must engage (Darling-Hammond 1997). If all students pursued an identical path to understanding, curricular design strategies alone might be sufficient to ensure learning. However, a world of human diversity and cognitive flexibility requires sophisticated and ever-changing teaching judgments grounded in disciplined experimentation, creative engagement with the learning context presented in the moment, incisive interpretation, and rich reflection aimed at continuous responsiveness.

The essential humanity of teaching and learning requires that teachers be able to engage in systematic disciplined learning from the contexts of teaching as well as from theory about teaching and learning. Without an understanding of the ways people grow, learn, and develop, the influence of culture and context on learning, and strategies for organizing instruction, it is difficult for untrained teachers to make intuitively good judgments about how to deal with the specific events in the classroom. By the same token, with out an appreciation for the intense, interactive realities of classroom life and the multidimensional problems and possibilities posed by individual learners, it is difficult for individuals with only theoretical knowledge to apply what they know in practice. A major problem of teaching and teacher education is the problem of moving from intellectual understanding to enactment in practice (Kennedy, in press). The problem of enactment, especially in light of current expectations for teaching, is not trivial. As Villegas (1997) notes:

> Because teaching must build upon and modify students' prior knowledge, responsive teachers select and use instructional materials that are relevant to students' experiences outside school (Hollins 1989), design instructional activities that engage students in personally and culturally appropriate ways (Garibaldi 1992; Irvine 1990), make use of pertinent examples or analogies drawn from the students' daily lives to introduce or clarify new concepts (Irvine 1992), manage the classroom in ways that take into consideration differences in interaction styles (Tikunoff 1985), and use a variety of evaluation strategies that maximize students' opportunities to display what they actually know in ways that are familiar to them (Moll 1988; Ortiz and Maldonado-Colon 1986). (p. 265)

“There are many reasons why traditional context-free paper-and-pencil measures and low-inference observation tools are inadequate to assess the kinds of teaching and learning required by new standards for all students.”

The assessment of such complex performances requires equally complex and context-sensitive measures. There are many reasons why traditional context-free paper-and-pencil measures and low-inference observation tools are inadequate to assess the kinds of teaching and learning required by new standards for all students.

Studies of the predictive validity of traditional paper-and-pencil tests of teaching (for example, the National Teacher Examinations) have found little evidence that such tests are correlated with teacher ratings or teachers' classroom effectiveness (Andrews, Blackmon, and Mackey 1980; Ayers and Qualls 1979; Haney, Madaus, and Kreitzer 1987; Quirk, Witten, and Weinberg 1973). One reason for the lack of predictive validity may be that the ability to recognize information when it is presented is significantly different from the ability to produce the same kind of analysis or enact corresponding ideas or practices. Another reason may be that the tests that have been used to date have featured simplistic, decontextualized teaching scenarios (Darling-Hammond 1986) and have not focused on core tasks of teaching represented in ways that accurately reflect their conduct in classrooms, including the integration of multiple strands of knowledge and skill (Haertel 1990; Shulman 1987)Low-inference rating systems that tally specific teacher behaviors fail to address important differences in context and content, and they ignore the effects of teaching on learning. Research has demonstrated that effective teachers vary their behaviors across teaching situations, which explains the low generalizability of evaluation results based on low-inference behavioral instruments (Shavelson and Dempsey-Atwood 1976; Stodolsky 1984). These same context-related differences produce the inconsistencies among findings in process-product studies that have undermined confidence in simplistic translations of such studies' results into teacher evaluation instruments (Doyle 1979). In addition, observation instruments have limited generalizability and validity because they are based on limited observation time and do not generate enough samples of performance (Shavelson, Webb, and Burstein 1986).

Measurement issues are compounded by concerns about the effects that such tools have on teachers' practice when the instruments are the basis for training and high-stakes licensing or employment decisions. Teachers who learn to teach to noncontextualized behavioristic evaluation tools consider a narrower range of teaching concerns (Hoover and O'Shea 1987); they are much less likely to attend to issues of curriculum planning, content pedagogy, the relationship between teacher practices and student responses or outcomes, or the teacher's performance outside of the observation context (Darling-Hammond and Sclan 1992; French, Hodzkom, and Kuligowski 1990). As Floden and Klinzing (1990) note: "Training teachers to follow a fixed set of prescriptions discourages teachers from adapting their instruction to the particular subjects and students they are teaching. Hence, the instructional effectiveness of teachers given such training is unlikely to be at a high level" (pp. 16-17).

Clearly, teaching of the kind society is beginning to demand requires other forms of assessment that better reflect the complexity of teaching and can provide valid data to evaluators while helping teachers improve the caliber of their work with children and those children's families. In the remainder of this article we describe several approaches to the authentic assessment of teaching and describe how these practices are currently being used in preservice teacher education programs in the United States. We provide data regarding the identified tools' perceived effects on candidates and programs, and we conclude the with a discussion of key practice, research, and policy issues arising from the use of authentic assessment in teacher education programs.

What Constitutes Authentic Assessment of Teaching?

In the following paragraphs we outline four aspects of authentic contextualized assessment of teaching that address the limitations of other forms of assessment and appear from emerging research to be important both for measuring teaching well and for enhancing candidates' ability to teach well:

1. Assessments sample the actual knowledge, skills, and dispositions desired of teachers as they are used in teaching and learning contexts rather than relying on more remote proxies.
2. As they are used in practice and integrated into prospective teachers' ongoing learning opportunities, assessments require the integration of multiple kinds of knowledge and skill.
3. Multiple sources of evidence are collected over time and in multiple contexts.
4. The assessment practice includes multiple opportunities for students to learn and practice the desired outcomes and multiple opportunities for feedback and reflection.

1. Assessments sample the actual knowledge, skills, and dispositions desired of teachers as they are used in teaching and learning contexts rather than relying on more remote proxies.

Although some contexts for assessment may be a step removed from daily classroom life and assessments may sample only certain aspects of teaching knowledge or skill at a given time, the tasks undertaken require the integration and use of knowledge and skills as they are employed in practice. Assessment tasks include actual examples of the work of teaching (videotapes of teaching, plans, and assessments of student learning, for example) and analyses of teaching, learning, and curriculum or materials. Such assessments seek to deal with the problem of enactment; that is, the fact that neither talking or writing about teaching nor recognizing answers to multiple choice questions can fully predict a person's capacity to plan for, manage, or make sense of the complex realities of actual teaching. This criterion reflects the commonsense notion that if one wants to assess a performance skill such as swimming, it is useful to have the swimmer in the water at some point.

It is, perhaps, worth reemphasizing that the authentic assessment of teaching does not consist either largely or entirely of classroom observation. Many aspects of teaching are only indirectly visible during the classroom portion of a teacher's practice. These include planning how to represent content and how to adapt lessons to the needs of particular learners, working with children and their families and the community outside of classroom hours, analyzing individual students' special strengths and challenges, and working with colleagues on planning and integration of instruction and on student- and school-level problem solving—to name but a few. In such cases, classroom observations are actually remote proxies for the actual knowledge, skills, and dispositions to be assessed. Therefore, assessment tools such as interviews, teacher reflections and analyses, samples of feedback provided to students by the teacher and/or provided to the teacher by others, and other artifacts that represent these aspects of practice may better meet the underlying principle of authentic assessment.

2. As they are used in practice and integrated into prospective teachers' ongoing learning opportunities, assessments require the integration of multiple kinds of knowledge and skill.

One complaint about traditional teacher education has been that prospective teachers experience fragmentation among courses that treat different subject matter (content and pedagogy are one example, and learning, curriculum, and assessment are another) as well as fragmentation in occasions for dealing with theory and practice. This leaves much of the task of assembling a knowledge base for teaching to the student. As a result, prospective teachers may have gaps in their professional knowledge and they may experience problems translating theory into practice. Assessments that mirror teaching by seeking to integrate areas of knowledge that are used in combination can help forge these connections while better representing the tasks teachers must actually perform (Darling-Hammond, Wise, and Klein 1995).

An example of an assessment that meets this criterion would be the construction of a literacy assessment of one child with whom teacher candidates work in a field placement. The assignment might include identifying a child's strengths, interests, and needs in the domains of reading and constructing an instructional plan to support that child's development in reading. To be effective, an assignment such as this would need to be embedded within a program curriculum that provided opportunities for candidates to—

- read about the theoretical frame and research bases relevant to the task, including knowledge about literacy development, learning theory, assessment methods, and curriculum construction;
- experience instruction that modeled the use of the knowledge and skills required to complete the task;
- practice the knowledge and skills required by the assignment in carefully selected and supported field experiences;
- be coached and assessed throughout the project by both school and college-based educators; and
- reflect on the assignment's goals and on their growth as they work to meet those goals.

Integrating assessment into the ongoing teacher preparation curriculum and instruction heightens the probability that prospective teachers will learn to integrate theoretical knowledge and practical skills and thus apply their knowledge and skills better than would otherwise be possible. It also increases the likelihood that complex assessments will be practically feasible. If such assessments are treated largely as add-ons at the end of a course or program rather than as integral components of ongoing curriculum and instruction, the time, labor, and expense of conducting them can become overwhelming within the institutional constraints of teacher education programs. Integrating assessments also helps to ensure that the necessary opportunities for learning are present, thus enhancing the probabilities of success.

3. Multiple sources of evidence are collected over time and in multiple contexts.

Two principles underpin this criterion. The first is that, if assessments are to support learning and provide the information necessary for sound decisions, they must be designed so that the evidence they gather is based on adequate samples of thinking and behavior. An isolated sample of performance is insufficient to inform judgments about learning, teaching, program development, or candidate competence. Tasks that provide only one kind or genre of performance data are equally inadequate. The portfolio assessments of the National Board for Professional Teaching Standards and Interstate New Teacher Assessment and Support Consortium (INTASC), as well as those used in many teacher education programs, are organized to meet this criterion. Robust assessments of knowledge and skill can include written analyses, observation data (e.g., data based on a supervisor's, cooperating teacher's, or principal's observation), and performance samplessuch as videotapes, samples of student work from the student teacher's classroom, and samples of communications with families.

In addition, because context does matter, assessments should provide candidates with opportunities to show their abilities in different settings, with different students, and with different lesson content. If teacher education is professional education, it should prepare candidates to consider the different needs of students, demands of subject matter, and other context variables when they are making decisions. The conscious cognitive effort entailed in differentiating and analyzing the factors represented in different settings for practice is what distinguishes preparation for professional practice from an apprenticeship model in which novices aim to copy the skills of a veteran practitioner under the assumption that those skills will be applicable in all contexts. The literacy assessment assignment described previously could meet this criterion if candidates completed it a second time in a different context with a child who has different needs and abilities.

Designing assessments so that candidates will explicitly recognize the importance of context differences could promote development of more finely tuned perceptual and analytic abilities, reinforce the development of more professionally oriented and context-sensitive preparation programs, and advance the representation of different sociocultural and other contexts in performance assessments. As Villegas (1997) has noted regarding performance assessments, "Built into (an assessment) context are tacit expectations regarding how candidates are to display their pedagogical expertise. When left unexamined, these expectations can become a major source of problems in performance assessments" (p. 273).

4. The assessment practice includes multiple opportunities for students to learn and practice the desired outcomes and multiple opportunities for feedback and reflection.

This criterion reflects a new expectation regarding the purposes of assessment—that rather than just measuring outcomes it also it helps develop competence. Moreover, for a teacher, neither "teaching" nor learning is over at the end of the day. A teacher is not something one becomes but rather something one is constantly becoming. Consequently, a core function of teacher education is to increase candidates' ability to reflect on and learn from teaching. Assessments of a teacher's work that include opportunities for learning from feedback and reflection both support the development of greater levels of competence and measure a critical attribute of an effective teacher: the ability to learn from practice.

Tools for Authentic Assessment

We examine five tools that meet the conditions just outlined: cases, exhibitions of performance, portfolios, action research, and school or classroom change projects. Each provides a means for organizing curriculum and instruction in a teacher education program and for assessing prospective teachers' developing abilities. Although none of these tools represents the totality of teaching on its own, each assesses essential aspects of teaching and maps onto a different metaphor for teaching in an interesting way. Cases, for example, develop and assess teachers' abilities as decision makers. Portfolios reflect the teacher as a continuous learner who reflects on practice. Exhibitions reflect the performances of teaching and the teacher as an artist. Research and inquiry develop teachers as social scientists and analysts. School and classroom change initiatives address the teacher as a moral change agent. When used in combination (as is the case in an increasing number of teacher education programs), such tools allow novices to integrate different aspects of what they have learned and apply that knowledge in different ways that, together, enable them to act in multiple capacities inherent in the role of professional teacher.

A counter image is that of the beginning teacher as a "floundering swimmer" (e.g., someone whose entry into teaching is a sink-or-swim affair). Research on teacher development (Fuller 1969; Katz 1972) has suggested that beginning teachers may not be capable of advanced practice until they successfully work through concerns related to rudimentary survival and classroom management. However, the experience of programs using these contextualized assessments of teaching suggests that beginning professionals are capable of much more sophisticated practice than previously documented (Darling-Hammond, in press; Koppich, in press; Merseth and Koppich, in press; Miller and Silvernail, in press: Snyder, in press; Whitford, in press; Zeichner, in press). The caliber of the work generated by teacher candidates in programs where study is both rooted in practice and unremittingly analytic suggests that the beginning professionals can shift their focus from themselves to their students much more quickly than once thought when they have tools to help them train their sights on the effects of their actions and decisions.

Cases

In the preface to their book ***The Case for Education: Contemporary Approaches for Using Case Methods***, Colbert, Desberg, and Trimble (1996) note that the growing interest in using case methods in teacher education can be explained with one word: *context*. Cases add context to theory. Whether they take the form of case reports (first-person narratives of personal experiences of teaching) or case studies (third-person analyses of situations or students), cases allow exploration of precepts, principles, theories, and perennial issues as they actually occur in the real world. Students may read and analyze cases, seeking the lessons and insights offered, or they may write their own cases, developing interpretations of events as they work through the process of representing their experience. These efforts can motivate learning, serve as instructional material for others, and provide "antidotes to the dangers of overgeneralization" (Shulman 1992, p. 3). Typically, cases represent instances of teaching and learning that pose dilemmas, provide carefully assembled evidence or data, and, sometimes, describe the outcomes of various decisions in specific situations. Contexts for cases may be defined by the nature of the subject matter and students; the history of a class, an event, or an individual; and the situations observed or strategies attempted.

Some cases—visions of what is possible—are contextualized and compelling sagas that can inspire and guide. Other cases describe the collision between design and chance and the surprises that are the essence of teaching experience. Through careful analysis of such cases and the inevitable impediments between aspiration and accomplishment, teacher candidates develop theories and strategies. Cases may be developed from any number of perspectives. For instance, they may start from a subject matter perspective, probing teachers' understandings of curriculum and instruction by examining how teachers configure and later analyze learning experiences aimed at the mastery of certain skills and content in light of student needs and classroom conditions. They may also arise from a student perspective, assessing teachers' knowledge and their skills of observation and interpretation by examining how teachers' evaluate student learning and development in terms of strengths, interests, and needs. They may spring from a cultural perspective, allowing teachers to inquire into students' lives and contexts in order to prepare teachers for the intellectually and emotionally demanding experiences that can arise in culturally diverse classrooms and communities.

When using cases, teacher candidates either receive or construct context-specific narratives about students, teaching events, or teaching and learning environments. They analyze and interpret those narratives in the light of other knowledge from research, theory, and other experience. Well-wrought cases may provide scaffolding that enables teacher candidates to come to understand certain principles or prototypic dilemmas of teaching that are consciously embedded in the case and made analyzable by the variables and events presented. When teachers or teacher candidates construct cases themselves, the process of writing the case helps the writer learn to move between levels of abstraction and thereby understand the relationship between concrete details and larger principles or issues. The opportunity for this to happen is enhanced if there is an interactive process of review and commentary that pushes the writer to explore the deeper meanings of the case.

As Shulman (1992, 1996) describes it, the initial experience of the case writer is a first-order experience with all the power of any intense encounter with reality. However, a first-order experience lacks opportunity for reflection and does not necessarily encode experience in a way that easily yields its meaning. The process requires that, as case writers encode experiences into narrative, they reflect about what occurred. With a process of review and revision, the meanings of the event are probed and elaborated. When written and shared, the narrative product becomes a second-order experience in two ways. First, the narrative is no longer the experience itself but rather a reconstruction of the experience in language; second, once it is recorded in language, the "experience" becomes available to a community of peers and colleagues. From the point when it is disseminated, the case becomes a third-order experience because the meaning of the narrative now resides in the community. In this way, just as they do in law, business, medicine, and other professions, teaching cases bridge the gap between personal situated knowledge and shareable, generalizable knowledge. The assessment of a case created by a teacher rests on the case writer's ability to connect information about teaching events, students, or situations to a broader body of knowledge about learning, teaching, development, culture, motivation, and behavior and to identify the relevant contextual influences.

One example of this process is the work done by teacher candidates at Stanford University, who develop curriculum cases as part of their program. Shulman (1996, p. 204) describes one of these cases: a narrative drama in three acts written by teacher education student Mark Ellis while he was working as a geometry teacher. Ellis knew that all his students had already encountered the concept of*pi* in previous classrooms. He soon discovered, however, that his students understood the concept as a memorized set of digits, "an arbitrary constant with no discernible reason other than that some Greek said so several thousand years ago." Mark wanted his students to understand that pi is not an arbitrary number but rather a ratio that is based on the universal, unchanging relationship among the circumference, diameter, and area of a circle. Mark recognized that if he wanted his students to understand the concept of ratio, they would need to understand the concept of proportion, which in turn rests on notions of scale. In his teaching, he designed demonstrations and discussions of scale models, architectural drawings, maps, and other artifacts in which the ideas of scale and proportionality are central. The first "act" of Mark's narrative drama consists of a compelling analysis of the complexity of both the concepts of the subject matter and potential instructional strategies.

In the second act, Mark's narrative describes how his plans played out in the classroom. Sometimes the students seemed not to understand even very rudimentary ideas. At other times, his examples and exercises seemed magical. He wonders whether his students really understand or are exceptional actors at feigning comprehension. When students complete their final essay examination that includes an open-ended question on the meaning of pi, he anxiously awaits the results. Studying their answers, his heart sinks. Only two responses reflect anything beyond a superficial understanding of pi.

Unlike a 30-minute situation comedy, the third act does not tie up the loose ends. Mark does not reteach pi and his students therefore live happily ever after. Rather he rigorously analyzes student responses, reflects upon his assumptions and anticipations, and develops a theory that accounts for his experience. His theory is that the persistence of the students' prior knowledge of pi is greater than he anticipated. From his theory, he suggests alternate strategies that he predicts will be more likely to modify or even eradicate (he is an ever hopeful individual!) prior misconceptions. As a tool for assessment, the case allowed Mark's teachers to examine his ability to bring together his technical and theoretical understanding of the influence that prior knowledge and preconceptions have on student understanding as well as to examine his personal reflections on his own and his students' intentions and actions.

Another case approach is the development of case studies in which the author functions not as the main protagonist or an actor but rather as a researcher inquiring into a situation. The case study can focus on a classroom, school situation, event, or particular student. When students are the objects of inquiry, the case study can help teachers learn to apply knowledge of development, learning, behavior, and motivation to specific children who function in contexts framed by family, school, culture, and community. Often, the goal of such case studies is to examine student growth and development with an eye toward identifying strengths, developmental progress, important influences, and needs. Teacher education programs such as Bank Street College and Columbia University's Teachers College engage their students in conducting child or adolescent case studies to help them link theories of learning and development to observation of actual children. Collecting and analyzing data for the case study—from observations, interviews, records, and analyses of student work—helps them develop their skills of observation and documentation and their ability to analyze how children learn and determine how specific children can be supported during the development process. In this case, the narrative explicates with detailed examples a young person's thinking, learning, interactions, beliefs, concerns, and aspirations. The plot is more biographical—creating a theory of a person rather a single event. In some instances, child case studies can be the basis for evaluating how better to work with a child who is having difficulty. Written versions of such studies codify the actions often performed by teachers when they individually evaluate a student using multiple tools of evidence or when they collectively participate in the descriptive review of a child, pooling their observations to figure out how better to support the child. Like case conferences in medicine, these events are built on careful, detailed observation and shared expertise aimed at more powerful analysis of a situation.

A vivid example of this kind of analytic child case study is provided in the account of Akeem, a third-grade student who entered Susan Gordon's classroom in a New York City elementary school after having been expelled for throwing a desk at a teacher in another school (Darling-Hammond, Ancess, and Falk 1995). The case begins by describing Akeem's frequent outbursts, his efforts to disrupt classroom meetings, and his periodically surly and aggressive behavior. It proceeds to describe Gordon's efforts to document, using many tools of observation and assessment, exactly when these outbursts occur and how she discovered that Akeem's misbehavior tends to occur when certain kinds of academic tasks arise. She concludes that Akeem's actions seem designed to deflect attention from the fact that he cannot read well or write with any ease. The case provides a detailed description of Susan's work with her colleagues to discover what Akeem does do well, provide him with opportunities to build on his strengths, and develop strategies for addressing his specific literacy needs.Susan allows Akeem to work in hands-on learning centers that tap his artistic skills and his abilities to construct machines and models. She finds him books and develops writing assignments that build on these interests while systematically teaching him new strategies for reading. As the case unfolds, Akeem develops architectural drawings and sophisticated comic books that he later annotates and turns into books. He gains his peers' recognition for his artistic and mechanical abilities and begins to gain status in the classroom; he joins classroom activities with increasing enthusiasm; and, not incidentally, he learns to read and write. The case follows Akeem until he finishes middle school with a solid academic record, near-perfect attendance, and admission into a specialized high school for the arts.

The case provides novices with an illustration of how to collect evidence about students' learning and behavior in light of broader knowledge about both, how to diagnose learning needs, and how to build a set of teaching strategies that addresses these needs. When novices construct their own case studies of children, they engage in similar kinds of diagnostic thinking and in an integration of information from many perspectives: cognitive, social, emotional, and physical. Even if the storyline is not as dramatic, the case construction process enables novices to learn how to apply theoretical knowledge to concrete examples and the case serves as a basis for evaluating their ability to do so.

A third approach is illustrated in the Teachers for Alaska Program at the University of Alaska, Fairbanks, which uses cases to highlight the fundamental dilemmas of multicultural teaching in a local cultural context. In this program, cases perform several important functions: offer a preview of situations students may encounter during their teaching careers; provide descriptions of strategies successful teachers use in handling these gnarly situations; and help novices understand that many situations are not "problems" to be solved but rather "messy dilemmas that require all the imagination, intellectual resources, and tact at a teacher's command" (Kleinfeld 1998, p. 145).

Teachers for Alaska replaced the traditional sequence of foundation courses and methods courses followed by student teaching with a program organized around curriculum blocks, each of which emphasizes the study of a case that is thematically related to the subject matter being taught. The cases consist of actual stories of the dilemmas faced by teachers in the culturally diverse classrooms and communities of Alaskan villages. They are modeled on the "dilemmas" approach to case method teaching used by the Harvard Business School to prepare practitioners for action in complex and uncertain contexts (Christensen and Hansen 1987). These cases introduce students to the "tangled issues of teaching in remote villages—the simmering animosities between local people and high-paid outsiders, unfamiliar cultural rules that new teachers could unwittingly violate, the organization of power in village communities, the injustices the educational system has visited on villagers, and also the injustices visited on outside teachers" (Kleinfeld 1998, p. 142).

Each teaching case consists of two parts. Part 1 poses the dramatic problem nested within a web of related issues. For instance, one case begins with a classroom fight between an Eskimo student and an Anglo student. The teacher responds by sending all the students except the Eskimo student into the hall. As the case develops, the teacher realizes that the fight is related to the grading system he uses in the class. The Anglo student makes a cutting remark about the Eskimo student's work ("D minus, huh?"). Later the teacher discovers that the Eskimo student's interpretation of this remark cuts to the core of his identity ("He says I am dumb because I am native"). In addition, the case develops contextual issues such as the stress of culture fatigue, the hostility of the local community, and the lack of support from the school administration. In the case, the teacher considers such pedagogical and ethical issues as what constitutes a fair grading system in an English class where some students are children of "outside professionals" and native speakers of English whereas others are Yup'ik-speaking children of subsistence hunters, what alternative grading options might be considered, and what political repercussions might arise. The case presents teaching problems not as prepackaged, neatly solved exercises but as messy dilemmas. The critical task for students in their discussion of the cases, as in teaching, is first to understand and then to proceed from that understanding to determine what to tackle and what to ignore.

Part 2 of the Teachers for Alaska cases show how experienced teachers go about addressing the issues raised in the first part. The advantage of Part 2 is that it features specific strategies that candidates can consider using themselves. In the example just presented, for instance, the teacher revised his grading system by including individualized goals for each student and grading students on their success in meeting their individualized goals. He created a bulletin board titled "The Theme Is Excellence" to display students' work, pictures of students doing homework, and local newspaper articles about their parents. With other teacher colleagues, he organized a community relations campaign with asuccessful poster showing an Eskimo mother with a baby superimposed over a classroom of students. The caption read, "WE TEACH . . . the children you love." In keeping with the program's keep-it-messy theme, this case ends with a paradox: the teacher "burns out" and leaves the community. During the program, students write a case from their own student teaching experience. Many of these cases become part of the curriculum for the program the following year. They provide a base for assessing students' success at understanding their work in a multicultural context and for developing productive strategies for reaching their students.

The case-based approach, coupled with carefully structured course work and clinical experiences, appears to make a difference for candidates' learning. Evaluations of the Teachers for Alaska Program show measurable improvement in students' cross-cultural teaching skills from the point of entry until graduation. Trained observers documented the prospective teachers' performance as they taught lessons to groups of culturally diverse students. The prospective teachers were observed twice: during their first semester on campus and again after their student teaching experience in the villages. At the time of their entry into the program, 28% of the candidates took culturally different students' frame of reference into account. At the program's midpoint, 62% did so. At the program's end, 83% did so. At program's inception, 12% of the candidates took the students' vocabulary and speech patterns into account; 31% did so at the program's midpoint, and 46% did so at the program's end. Other measures, such as the use of active teaching strategies rather than lecturing, showed similar changes (Kleinfeld 1998). Examining and practicing teaching in cultural and community context appears to strengthen teachers' ability to take their students' cultural backgrounds and other characteristics into account.

Exhibitions of Performance

Whereas cases provide sites for analysis of teaching decisions and outcomes, exhibitions of performance address the problem of enactment. Exhibitions allow teachers to demonstrate particular abilities in ways that draw upon or closely simulate teaching contexts or events. Exhibitions can draw upon tools such as observations or videotapes of teaching, artifacts such as teaching plans, or even group activities that simulate what teachers do when solving problems of practice with colleagues. The distinguishing feature of an exhibition—and what differentiates it from an unguided observation of practice—is that an exhibition allows the evaluation of these abilities in relation to articulated standards of practice.

The teacher education program at Alverno College[1] uses frequent exhibitions of performance, benchmarked against standards of practice, as the foundation for much of its work. The college's overall curriculum is built on opportunities for students to master a set of eight general education abilities (expected of all students in the college) and five advanced education abilities (specific to teacher education students). These abilities clearly state what program graduates are expected to know, be like, and be able to do to complete the program successfully and become certified as elementary teachers. From their very first day at Alverno when they make a videotape of themselves giving a short speech to their peers, students are constantly assessed in relation to these abilities. Alverno premises its tight coupling of content, pedagogy, and assessment on the belief that learning occurs best when learners have a good sense of why they are learning something, specific standards that must be met to accomplish this learning, and a way of seeing what they have learned.

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[1] The following discussion draws primarily upon a study of Alverno's teacher education program by Ken Zeichner (in press) and upon Alverno College program documents.

Alverno's definition of abilities includes "a complex integration of knowledge, behaviors, skills, values, attitudes, and self-perceptions" (Diez, Rickard, and Lake 1994, p. 9). As a result, faculty believe that the best way to determine how well candidates have developed the abilities is to assess behaviors that are associated with those abilities. They also believe that such assessments enhance learning through feedback regarding learner strengths and weaknesses as well as through self-assessment. Alverno's faculty developed an elaborate performance-based assessment system that enables candidates and their teacher educators to know how well candidates are developing the abilities. The performance assessments focus on the quality of students' conceptual integration of the components of the abilities: knowledge, skill or behavior, attitudes, and values. Candidates apply their knowledge and skills in realistic contexts.

The general education abilities at Alverno include the following:

- communication;
- analysis;
- problem solving;
- valuing in decision making (the ability to understand the moral dimensions of decisions and to accept responsibility for the consequences of actions taken);
- social interaction (the ability to get things done in groups);
- global perspectives (the ability to articulate interconnections between and among diverse opinions, ideas, and beliefs about global issues);
- effective citizenship (the ability to make informed choices and develop strategies for collaborative involvement in community issues); and
- aesthetic responsiveness (the ability to engage in and make meaning out of artistic experiences and articulate reasons for choices of aesthetic expressions)

These abilities are assessed according to six developmental levels outlining increasingly complex knowledge, skills, and dispositions that students must demonstrate in program courses and field experiences. In general the lower levels involve the ability to identify particular skills or behaviors. The subsequent levels involve the ability to analyze, evaluate, and demonstrate those skills and behaviors, and the highest level is ability to facilitate the said skills' and behaviors' acquisition and use in group settings and interpersonal relationships.

In addition to the eight general education abilities, prospective teachers are expected to develop the following five professional education abilities that define the kind of teachers the program seeks to prepare (Alverno College 1996, p. 2):

- **Conceptualization**—the ability to integrate content knowledge with educational frameworks and a broadly based understanding of the liberal arts in order to plan and implement instruction;
- **Diagnosis**—the ability to relate observed behavior to relevant frameworks in order to determine and implement learning strategies;
- **Coordination**—the ability to manage resources effectively to support learning goals;
- **Communication**—the ability to use verbal, nonverbal, and media communication to establish the environment of the classroom and to structure and reinforce learning; and
- **Integrative interaction**—the ability to act with professional values as a situational decision maker to develop students as learners.

Faculty have articulated the goals of their work by lodging the development of these abilities within the following: the contexts of learners' developmental needs, an appreciation for diversity, a view of professionalism that includes ongoing inquiry to inform teaching, a concern for democratic education, and a commitment to the use of media and technology. The education faculty outlined a continuum of teacher development by spelling out the knowledge, skills, and dispositions expected of professional teachers at three different points in a teaching career: expectations for the beginning teacher (e.g., required for recommendation for a credential); expectations for the developing teacher with classroom experience; and expectations for the experienced professional teacher. These standards provide guidance for faculty in assessing students' developing abilities by providing concrete representations of what teachers should be able to do. For example, some of the expectations for beginning teachers in the area of conceptualization are as follows (Alverno College 1995):

- Developing sensitivity to learners as individuals within the group as a whole

- Making links between developmental theory and concrete individuals
- Recognizing the impact of differences (in culture, gender, learning preferences, etc.) to plan instruction that meets the needs of individuals and the group
- Planning material both to meet learners' current needs and to lead to the next level of development

When the college moved to the ability-based curriculum, faculty redesigned all coursework, field experiences, and assessments to ensure the systematic development of the knowledge, skills, dispositions, and attitudes implied by the abilities. All of the course syllabi at Alverno spell out which developmental levels of which abilities they address. In addition, syllabi describe the learning activities and assessments that are provided to help students learn the abilities and to judge how well they have learned them. When students enter the program, the college provides them with a handbook that shows how the key concepts are related to all of the abilities and infused into the entire professional education component of the program. The program philosophy is made transparent in this discussion. For example, the discussion of diversity reveals an action-oriented view of teaching for diversity:

> The view of diversity your faculty wants you to develop goes beyond having background knowledge of cultures to developing a proactive stance, which includes looking at the role that culture plays in society and its institutions, such as schools. It means working actively to negate stereotypes and taking actions that move toward the full inclusion of all learners. You will do this by reviewing literature for bias, by examining your own teaching performance for actions that neglect one group or individual, and by planning for the infusion of diversity throughout the curriculum. (Alverno College 1995, p. 27)

The program evaluates the outcomes of these exercises based on multiple sources of evidence such as essays, letters, position papers, case study analyses, observations of events, talks to simulated audiences, productions of videos and curriculum materials, simulated events such as parent-teacher conferences, and the like. Students also experience a series of required external assessments enabling them to pass from one stage of the program to another. For example, in a fifth semester external assessment integrating learning from several courses, five or six students are asked to assume the role of a teacher group called by the district to review the district's mission statement. Candidates study background materials such as the district's philosophy as well as readings on such issues as curriculum integration and multicultural education. In preparation for the videotaped assessment, students review the criteria for the abilities of social interaction and effective citizenship by which their performance will be assessed. Following the simulation and before receiving feedback from faculty, they view the tape of the meeting and complete a self-assessment response form (Zeichner, in press). Virtually every assignment and assessment begins with reference to the criteria for the performance being developed and ends with an opportunity for candidates to evaluate their own work. The result, as indicated by the judgments of cooperating teachers, college supervisors, employing principals, and candidate assessments of preparation, is a set of graduates who are both extraordinarily self-reflective and particularly well prepared for sophisticated practice in the classroom. As one principal who hires Alverno graduates observed:

> They constantly reflect on their instruction and they're very open to suggestions or to changing a lesson. They're very able to assess the actual lesson they've taught and in a fairly critical manner. They have the skills to do that. . . . That's not to say that other students are not able to pick it up. It's just that Alverno students seem to come with that knowledge. They've been forced to practice it on an ongoing basis so they have refined it. (Zeichner, in press).

In teacher education, as in elementary and secondary education, the value of continual public practice and assessment through exhibitions of performance has multiple benefits. As Sizer (1992) observes of exhibitions in his work with reforming secondary schools, these demonstrations can help make clear what students should be able to do and focus effort accordingly, help faculty "map backward" from their conception of desired learning to a curriculum that can develop such learning, and provide a basis for accountability to the student and to the broader public that a program serves.

Portfolios

The benefits of exhibitions can be expanded still further when evidence of performance is assembled to allow a more integrated and holistic examination of abilities. Portfolios are means by which teachers select and reflect on artifacts of their practice collected over time and from multiple sources to provide evidence of their thinking, learning, and performance. Portfolios can include documents that derive directly from teaching—copies of lesson or unit plans, syllabi, handouts given to students, assignments, tests, and samples of student work (with or without teacher feedback)—as well as photographs, videotapes, or audiotapes of classroom activities ranging from bulletin boards and displays to taped lessons, conferences with students, and the like (Darling-Hammond, Wise, and Klein 1995). They can also include documents that require additional work on the part of the teacher, such as teacher logs or journals, detailed descriptions or analyses of lessons, student work, and reflections on the outcomes of teaching activities. Portfolios can include documents that derive from the evaluations of others: notes by an observer of teaching, peer or administrator recommendations, student evaluations, and so on (Athanases 1990; Bird and King 1990; Haertel 1991).

Teacher portfolios provide opportunities for robust documentation of practice. As an assessment tool, they can provide a comprehensive look at how the various aspects of a teacher's practice—planning, instruction, assessment, curriculum design, and communications with peers and parents—come together. As a tool for learning and reflection, portfolios can alleviate what Shulman has referred to as "pedagogical amnesia," a disease endemic to teaching at all levels. Pedagogical amnesia—which is characterized by the inability to remember, much less exchange the fruits of teaching experience—is actually a symptom of the multidimensional complexity of teaching. So much happens so fast that everything is a blur. Portfolios, like cases, help make teaching stand still long enough to be examined, shared, and learned from.

In the portfolio assessments of the National Board for Professional Teaching Standards, candidates include collections of the work of several different students over many weeks of teaching, rather like mini-student portfolios. They show and discuss their teaching, evidence of student learning, the responses they have made to student work, and the responses students have made, in turn, tothese teaching efforts. In short, they exhibit and reflect upon a set of reciprocal teaching and learning interchanges in which their own learning about their students is as fundamental to the act of teaching as is their students' learning in response to specific lessons. Teacher and student learning influence each other and are completely interwoven. Teachers consistently testify that the process of developing such a portfolio is a powerful occasion for their own learning (Athanases 1994; Bradley 1994; Haynes 1995; Tracz, Sienty, and Mata 1994; Tracz et al. 1995).

Preservice teacher preparation programs are increasingly using portfolios as means for aggregating and integrating learning experiences, and assessing students' readiness to assume the responsibility of teaching. At Alverno College, performance assessments drawn from exhibitions and other sources are assembled in a portfolio that provides the basis for a portfolio interview assessment that occurs at the end of preprofessional stage of the program and is used as a gateway to student teaching. Students create a portfolio by reviewing their work in all of their courses to date. They collect examples of written work, lesson and unit plans, videotapes of their work with pupils, and instructional materials they have created and use those materials to make decisions about what represents their strengths. The portfolio includes a written analysis of a videotaped lesson based on the five abilities. Student faculty advisors as well as teams of school-based educators from area schools review the portfolios. The principal and teacher assessors provide feedback to students about their areas of strength and areas of needed growth as demonstrated in the portfolio, and they make a recommendation to Alverno about the students' readiness for student teaching. Candidates, using the input of school and college-based assessors, formulate specific goals for their student teaching experience (Zeichner, in press).

At the University of Southern Maine (USM), secondary teaching candidates develop a portfolio of their practice over the course of a year-long graduate-level program in which they are placed as interns in school classrooms while simultaneously completing course work in teaching methods, learning and development, curriculum, and assessment (Lyons 1998). The portfolio includes the evidence that candidates offer as a basis for the judgment as to whether they are ready to complete the program and become certified to teach. A panel of university- and school-based faculty makes the ultimate judgment about certification following a portfolio interview in which the candidate presents and defends his or her work. The portfolio construction process is designed to foster continuous self-reflection and internalization of a set of standards for teaching. The standards for what beginning teachers should know and be able to do were developed by faculty who drew on the model licensing standards offered by the Interstate New Teacher Assessment and Support Consortium (1992); they include statements of knowledge, skills, and dispositions in the following areas:

- Knowledge of child and adolescent development and principles of learning
- Knowledge of subject matter and how to make it accessible to students while fostering independent inquiry

- Instructional planning based on knowledge of the learner, the subject matter, the community, the intended student outcomes, and the curriculum
- Uses of instructional strategies and technology to promote learning and independent inquiry
- Assessment for communicating feedback and promoting self-evaluation
- Respect for diversity and the ability to create instructional opportunities for diverse learners
- Well-articulated beliefs about teaching, learning, and education linked to demonstrable practices in support of those beliefs
- The ability to plan instruction that promotions the values and practices of citizenship
- The ability to work collaboratively to improve the conditions of learning for students and adults
- Commitment to reflection and continuous professional development
- Classroom management that supports individual responsibility and democratic community

Candidates assemble their own body of evidence to demonstrate their learning and competence across these areas. The evidence may include artifacts such as their own statements of teaching philosophy, classroom lessons, student work, and so on. The process of portfolio construction also includes critical conversations regarding the candidate's practice with mentors or peers who are part of a portfolio team and reflections on the contents of the portfolio that describe what each entry represents and why it is included, what the teacher learned from the experience about teaching and learning, and why that is important—that is, the personal meaning of the learning. The process concludes with a portfolio presentation to faculty and peers that is a major aspect of the final graduation and certification decision (Lyons 1998, p. 19).

This process of construction and reflection on the portfolio is as important to the outcomes for candidate learning as are the portfolio components themselves. It is through this process of selecting and discussing artifacts of their practice that candidates internalize the standards, examine more deeply what they are doing/have done and what their actions mean, and gain multiple perspectives on the meaning of events that deepen their ability to learn from those events. This notion is implicit in Shulman's (1994) early definition of a teaching portfolio as "the structured documentary history of a (carefully selected) set of coached or mentored accomplishments substantiated by samples of student work and fully realized only through reflective writing, deliberation, and serious conversation." The ways these processes contribute to the value of candidates' learning are illustrated by these comments from two of USM's teacher interns. In the words of the first teacher intern—

> The portfolio process worked best when it helped me to reflect on what I can improve on and what I did well. I have found that when I am in the process of something I become convinced that I will remember it—including all the details. But I don't. . . . I have found that when I reflect and create my portfolio, I reinforce the event in my memory so that I am less likely to forget about it. The process of reflection imprints the event in a unique way. . . . What this points to is the need to create portfolios contemporaneously with the [teaching] process. (Davis and Honan 1998, p. 96)

The second teacher intern's comments were as follows:

> Designing my portfolio helped me to clarify and articulate visually and in writing my teaching philosophy. It is the actual process that I value: collecting artifacts, organizing, reflecting, and receiving feedback at the portfolio evaluation. . . . By receiving positive feedback and constructive criticism, I concluded that my portfolio is a continuum of my learning as a teacher, i.e., it will never be done. Instead of my portfolio presentation being a final, pass/fail assessment, it was a learning experience in and of itself. (Davis and Honan 1998, p. 98)

The benefits of well-constructed portfolios for teacher learning appear to derive in part from the fact that they accomplish the following:

- Raise teaching decisions to consciousness and thus make them available for deeper consideration from many perspectives. The process of looking at and thinking about decisions changes consciousness about teaching, and thus changes practice. Beginning teacher candidates who undergo such forms of assessment have to answer the question, "What am I supposed to be aiming for as I learn to teach?"
- Take a long view of learning and of the development of performance because proficient performances are cumulative and must be developed over a long period of time with continuous practice and reflection on practice.
- Support the developmental process by providing benchmarks for good work, vehicles for self- and peer assessment, and opportunities for revision and refinement.

- Connect thinking and performance thereby developing the capacity for reflection and action, rather than just one or the other. They bridge the traditional theory-practice divide by asking for evidence of performance along with a discussion of why decisions and actions were taken.
- Provide multiple lenses and multiple sources of evidence on thinking and performance, thus developing many facets of performance and allowing many pathways into learning.
- Make teaching and learning more public, thereby making the development of shared norms and standards possible, as well as making the sharing of knowledge and experience more available.

These factors combine to enhance the candidates' abilities to integrate the knowledge, skills, and dispositions required of teaching and provide tools for continuous development once teaching. As veteran teacher Shirley Bzdewka observed after completing the NBPTS portfolio process:

> I am a very different teacher now. I know I was a good teacher. But I also know that every teacher always has a responsibility to be better tomorrow than they were today, and I am a much more deliberate teacher now. I am much more focused. I can never, ever, do anything again with my kids and not ask myself, 'Why? Why am I doing this? What are the effects on my kids? What are the benefits to my kids?' It is not that I didn't care about those things before, but it is on such a conscious level now. (NCTAF 1996)

As assessment tools, portfolios that are structured around standards of practice provide another set of benefits. These include the ability to examine a teacher's practice not just in context but also in the light of a common set of expectations and benchmarks and the ability to do so with many sources of evidence that address all of the standards of concern. By giving assessors access to teachers'thinking as well as to evidence of their behaviors and actions (e.g., through videotapes, lesson plans, assignments, and the like), portfolios permit the examination of teacher deliberation—the ability to create appropriately contextualized teaching strategies—along with the outcomes of that deliberation in terms of the teacher's actions and evidence of student learning. The long-range view that is encouraged and supported by portfolios helps assessors overcome some of the "limits of looking" (Stodolsky 1984) that have plagued traditional observations of teaching. Assessors can examine a chain of events and thinking, analyze the quality of deliberation and the grounding of decisions, evaluate the quality and appropriateness of actions taken, and take into account the evidence of student characteristics and learning that are the basis for gauging effectiveness. In short, assessors using portfolios can "see" teaching in progress and make it hold still long enough to understand its intentions and effects.

Action Research/Inquiry Projects

Yet another way to examine and understand teaching in context is to embed systematic research about the contexts and outcomes of teaching and schooling into candidates' programs of study. In action research or inquiry projects, teachers design and enact systematic explorations of issues and dilemmas arising from their evolving experiences of working with children and their families. This systematic inquiry involves questions similar to those that teachers may explore with cases; however, the method extends beyond personal reflection about an individual's experiences and observations to broader and more structured investigation involving the collection and aggregation of data and information about a problem. Teacher research advocate Marilyn Cochran-Smith (1991) suggests that the posing and pursuit of questions provide important vehicles for teachers to understand both the complexities of teaching and the effects of different solutions or resolutions of endemic problems. "The ability to pose questions," she argues, "to struggle with uncertainty and build evidence for reasoning . . . is an indispensable resource in the education of teachers" (pp. 280-281).

Teacher research also transforms teaching from a private and hidden act into community property (Shulman 1996). Together with efforts to expand knowledge, the sharing and critique of practice create the cornerstones of professions. When teaching is treated as community property, problems, conjectures, analyses, and interpretations can be examined by collaborating professionals. These inquiries can be preserved for future study and can, just as all scholarship, ultimately be drawn on and built on by others. Such knowledge construction is not solely the domain of the more expert other: beginning teachers come with their own perspectives and interests. The benefits to the inquirers and to the profession are equally valuable no matter how many years of teaching experience the participants possess. Having prospective teachers engage from the start of their careers in action research or classroom inquiry can help prepare them as consumers of research and as developers of knowledge within the field. It can also give them tools to make sense of their practice, and can help them think analytically about the problems they will confront. As a tool for assessment, such research and inquiry can provide insights into a teacher's analytic ability and her ability to frame a problem in a manner that allows it to be thoughtfully examined. Such studies can reveal a teacher's disposition and skills for responding to problems of practice with strategies that may lead to improvement, rather than merely with personal coping mechanisms.

At the University of California at Santa Barbara (UCSB), student teachers develop an action research project as the culminating assessment for the master's program of study. The inquiry is reported through an issue portfolio (called the M.Ed. Portfolio) that is developed over a period of at least 11 months.[2] Early in their professional preparation year (August), students take an ethnography course to begin developing their ability to collect data in natural settings. By December, most students have identified an inchoate passion about some element of teaching and learning. Through a series of workshops and field-based experiences, students refine and focus their questions, moving between questioning and reflection on the concrete artifacts they have been collecting in their field experiences and in their course work. The data they collect may include articles from the research literature and other readings on the topic, analyses they have conducted through research papers and through data collected in their school or classroom, reflections on observed events that bear on the topic, and examples of their own teaching efforts and outcomes that bear on the topic.

By March students form self-selected support groups and are assigned a facilitator. These support groups meet regularly so that members can inform one another of their thinking/practice regarding their issue along with the evidence they have selected to document the outcomes of their inquiry and their learning and growth over time. These conversations, like those that accompany the construction of portfolios, provide multiple perspectives on the topic, raise new questions, and provoke deeper thinking. In the summer (June/July) following their full-time student teaching experience, students complete the M.Ed. Portfolio.[3] Recent examples of inquiry topics include the following:

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[2] This discussion draws upon Snyder, Lippincott, and Bower (1998).

[3] Some students postpone completion of the M.Ed. Portfolio, electing to give themselves another year in the belief that additional experience and reflection will enrich their portfolio, their teaching, and the learning of their students. The program holds a series of Saturday workshops through the subsequent year to support the growth of these students. Despite the logistical problems and the unpaid time and labor demands of this model, it remains the preferred choice of the program faculty who work with these first-year teachers.

- Student accountability: What is it? What's the point?
- What is inclusion? In what ways has my teaching/the system created inclusion/exclusion?
- How can I make my U.S. history curriculum meaningful to my second-language learners?
- In what ways do I/can I provide support for personal development through the guise of science curriculum?
- In what ways do I/can I bridge the gap between home and school?
- What are the roles of modeling in creating clear, explicit teaching while simultaneously allowing for creative and original student work?
- In what ways do I/can I assess transition English as a second language students?
- In what ways do teachers resolve the tension between their ideals and their daily experiences in the classroom and within a school?
- What do students really learn from doing homework?

Successful completion of the M.Ed. Portfolio involves two checkpoints. First, the group facilitator and all members of the support group must give their approval to the document. Once their documents have been approved by the group, students schedule a public conversation where they receive feedback on their portfolio from five critical friends. Candidates select their critical friends to include a school-based educator who knows the candidate well (i.e., a cooperating teacher), a school-based educator who does not know the candidate well (i.e., a principal, another teacher), a university-based educator who knows the candidate well (i.e., the supervisor), a university-based educator who does not know the candidate well (i.e., a content expert or researcher), and someone whose primary intersection with the school is as a parent or in a community/social service capacity.

Several of these public conversations occur simultaneously in a large room, somewhat like a poster session at the American Educational Research Association conference. Critical friends arrive prior to the session and review the entire document without the candidate present. The conference then is not a 2-hour presentation of the work but rather a 2-hour conversation about teaching and learning among professional educators about a topic of mutual concern. Students use the following criteria to help shape their inquiry. The support group and critical friends use the same criteria for assessment.

- **Composition**—coherence, clarity of themes, grounding in a teaching/learning incident
- **Power of the big idea/theme**—social significance of the topic, relationship to the field and importance for education, connection to the candidate's own teaching and to student experience
- **Growth over time**—Evidence that the research questions and the way the candidate thinks about them have evolved as the inquiry progressed, evidence of changed techniques and/or attitudes, discussion of lessons learned from "limited successes" and from problems encountered
- **Implications for future growth**—Discussion of additional questions raised, ways the work will affect the teaching and learning of the candidate and his/her students, and ways the work has shaped the candidate's plans for future growth

Like a minidissertation, the inquiry and its assessment are at least partly intended to develop and evaluate skills of investigation and analysis. In addition, the project is structured to encourage direct applications to practice. Finally, the process of evaluation is organized to ensure multiple perspectives on the question, including those of parents or community members, and feedback from various sources. The goal is the development of thoughtful practitioners who have tools to inquire into and address problems of practice throughout their career.

The emphasis on assessment of one's own learning as well as that of students appears to shape teachers' later practice. In a UCSB follow-up study of graduates, first-year teachers reported that they were using assessment tools with children that their teacher educators used (Snyder, Lippincott, and Bower 1998). The portfolio appeared to help teachers connect their self-assessment with their assessment practices with students. In addition, UCSB program graduates rated themselves better prepared to assess student learning and to use their knowledge of student learning to shape instruction than did a random national sample of beginning teachers (Snyder 1997).

School Change Projects

A similar set of goals motivates the use of school change projects in some teacher education programs. In addition to the skills of investigation and analysis, such projects aim to develop teachers as moral change agents in organizational contexts broader than a single classroom. In school change projects, teachers assume leadership roles in enhancing the educational environment of a particular site. Their work can be assessed both in terms of the "success" of the actual change project and their learning from the experience. Such endeavors constitute a proactive outlet for the knowledge and skills developed in other assessments of teaching. They offer opportunities to learn, practice, and assess the ability to assume responsibility for the learning of all students.

At the University of Connecticut, master's degree students in their fifth year of teacher education choose an internship project that serves as one of the culminating assessments of their teaching. The desired outcome assessed is the teacher as a moral change agent within a school context. The work of the internship is a school- or district-defined change project that has been selected by the student and requires a minimum of 20 hours per week in the school for an entire academic year. The process begins when school- and district-based educators work with the professional development center (PDC) coordinator (a college-based educator responsible for coordinating the school-university partnership at a particular site) to create possible intern projects that would meet their most pressing needs and goals. The PDC coordinator helps shape the proposals to make them marketable to the potential interns and to prospective faculty advisors (e.g., aligned with their on-going research interests). This ensures the feedback and reflection loops required of authentic assessment. During the spring of their senior year, students choose from among the proposals. Starting at the point when they meet with the school person with oversight responsibility for the project, interns embark on a year-long effort to support the work of school-based educators to enhance the educational outcomes of students in their care. The interns learn and practice such professional leadership roles as the following: designing and developing innovative curricula and/or programs, working collaboratively with teachers and administrators, and working with children or adolescents outside the context of a self-contained classroom.

Through the internships, PDCs become the context for teaching, research, and service for the interns just as they do for the college and school-based educators. Several recently completed intern projects include the following: creating a writing and math technology project, developing a language/writing enrichment project, establishing a geography lab, introducing portfolio assessment for students, aligning math, science, and language arts curriculum, developing a reading incentive program, launching an educational mentor program, working on a family literacy initiative, developing a study skills program, and developing an integrated reading and writing curriculum for high school students.

The project is evaluated as a master's dissertation, in much the same way that a doctoral dissertation would be. Students work with a committee and must demonstrate that they can conduct high-quality research as well as produce a new program or product in the real world. They are assisted both by school-based faculty and by "ladder faculty" in the university on both the research and change components. The evaluation is based on a formal research report with an oral defense.

Side Effects of Authentic Assessment Practices

The use of authentic assessment practices in teacher education appears to hold potential for influencing the learning of teachers and hence the learning opportunities of their students. In addition, the use of such practices appears to support ongoing program improvement that in turn influences the learning opportunities of prospective teachers in a cycle of continual improvement. Each of the sites described previously has conducted studies of the effects of their work. Those studies found evidence of positive effects of their assessment practices on the program as well as on teachers' learning.

Programmatic Influences

A study of the UCSB program found, for instance, that "portfolios made our program more visible to us as well as illuminated the developmental nature of teaching" (Snyder, Lippincott, and Bower 1998, p. 138). Faculty found that the portfolio processes undertaken in this program had the unintended consequence of helping cooperating teachers and others involved in the assessment of student teachers become more thoughtful about their own practice as well as their mentoring of novices. School-based educators not only gained a greater understanding of the program and the state's standards for teaching, which created more coherence between school- and university-based work, but they also began to construct their own portfolios as a means of enriching their own practice.

Authentic assessment can inform ongoing instruction and curriculum development, as well. For instance, when one of the authors recently taught a course on the education of adolescents, the use of case studies transformed her teaching. The students, who were preservice and inservice middle and high school teachers, were asked to apply what they had learned about adolescent development through readings and discussions to a case study of a young person that entailed observation, shadowing, and interviews. The first drafts of case studies made it clear that, although teachers were very perceptive about the social and emotional development of the students they studied, few had any real notion of how to examine student thinking or evaluate it in terms of cognitive development. The teachers had never really learned how to look for evidence of reasoning and understanding. As a result, the professor began to treat the issues of cognitive development more extensively and concretely by using videotaped and written cases of student learning—often through the lens of performance assessments—to illustrate how cognitive development could be both scaffolded and assessed. Having more than superficial evidence about the thinking and reasoning of one's own students can allow a teacher educator to better adapt instruction and to redefine program content. This is made possible by having a clear view of what the desired learning goals are (a standards-based frame) along with rich tools for inquiry and assessment about what candidates are understanding.

Although anecdotes suggest the promise of these tools for improving practice, the field lacks systematic large-scale research evidence linking preservice teacher learning opportunities with inservice teacher classroom practices and teachers' classroom practices with student learning outcomes. As Kleinfeld (1998) notes, "Virtually no formal evaluations of case-based teaching have been done to ask if teachers prepared through the case method actually teach better" (p. 145). The same could be said of any of the assessment practices described earlier. This is partially attributable to the multitude of variables that such research would need to consider, as well as to the multitude of factors that influence teacher and student learning—many of which are outside the purview of teachers or teacher educators. Still, recent work that has established links between specific kinds of teacher learning, teaching practices, and student learning (e.g., Cohen and Hill 1997) suggests that such research is both possible and supportive of the kinds of learning described earlier.

Practical Issues

The use of these curriculum and assessment practices in teacher education programs also poses issues and challenges that educators and policymakers need to take into account if such practices are to meet their potential for supporting the learning of teachers and their students. To address the complex issues of contextualized teaching with well-developed tools for scaffolding and assessing learning, institutions charged with responsibility for educating preservice teachers will need to reshape their programs and the nature of their work and reward systems.

As an add-on, authentic assessment of teaching is too expensive—in terms of both time and money—to be feasible. Unless such assessment is embedded within a coherent program of study and treated as part of the curriculum and teaching process, it cannot be sustained. Embedding authentic assessment of teaching in preservice teacher education requires three sets of resources: the time and expertise of school-based educators, college-based educators, and prospective educators who are working closely together to develop and discuss practice over time. Thus, instead of the usual fragmentation of effort that has characterized teacher education in the past, these three sets of resources need to be concentrated in time and space. For example, authentic assessment practices are more effective when there are groups of prospective educators working with a team of cooperating teachers at a school site (as in a professional development school model) and clusters of teacher education faculty working together with one another and school-based faculty. In addition, such practices are more effective when prospective teachers' clinical experiences are concentrated in time and place, as for example, when they engage in year-long field experiences in a single school.

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However, such concentration of effort works only when supportive structures and processes are in place. One of the most important structures is time to develop and sustain the conversations and relationships necessary for the kind of learning embodied in authentic assessments. This in turn requires both rethinking how the existing resources are organized and used and how schools and colleges fund and organize responsibility for the education of teachers. Among the policies that are implicated in these matters are funding streams from state governments that typically discourage collaboration between schools and colleges, university hiring policies that often provide too few faculty for the work of teacher education, tenure and promotion policies that fail to reward work with schools, yearly and quarterly schedules that place university calendars at odds with those of schools, and curriculum that is fragmented in its organization and emphasizes superficial coverage over the development of proficiency and understanding. Creating alternative conditions requires sustained leadership and commitment within schools and universities in lieu of the more mercurial leadership that strikes while the irons of opportunity are hot and moves on when they are not. When policies that encourage collaboration and coherence are in place, sites can enact authentic assessment of teaching without a significant influx of new funds and without doubling the time demands of the program (Snyder 1998).

Even with these institutional conditions in place, however, teacher educators face a dilemma comparable to the one faced by K-12 teachers who use authentic assessments: What should they do in the event of mismatches between assessments mandated by state policy and embedded authentic assessment practices? Most states, for example, still use multiple-choice tests of subject matter and teaching knowledge as the basis for granting a beginning teacher license. Although these tests provide little evidence of predictive validity for teaching, they increasingly determine candidates' opportunities to teach and the fate of teacher education programs seeking professional accreditation or state approval. Should teacher education programs continue to try to develop and use authentic, contextualized assessments of teaching? Or will they sacrifice their candidates' ability to receive a credential if they do not turn their programs into a sequence of test preparation courses? How well will candidates from "authentic" programs perform on the exam(s) as compared to those in who attend "test prep" programs? How effective are differently prepared teachers in the classroom? Until teacher educators subject their work to rigorous inquiry that can begin to answer these questions, policy and practice are likely to remain at odds.

Among the questions that are important for future research are, at least, the following:

- How well do different types of assessments measure the capacity to teach? What evidence can be developed of the predictive and consequential validity of various measures?
- What are the effects on teacher learning of the use of different types of assessment?
- Given the fact that no single measure of teaching is adequate to the task of representing such a complex activity, what mix of assessment methods, instruments, and sources of evidence seems to provide the greatest leverage on teacher development, on the one hand, and valid assessment, on the other?

Continued work on these questions may enable teachers and teacher educators to develop strategies that are both powerful and practical for the development and evaluation of contextualized teaching.

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Afterword

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The Problem and the Needed Response

This final chapter first identifies common problems that constrain high performance by teachers and students and especially how those endeavors portrayed in earlier chapters under the umbrella term *contextual teaching and learning* might be brought to bear on these problems. It next makes several recommendations aimed at overcoming these constraints with an emphasis on how teacher preparation needs to undergo fundamental changes as the central strategy in these reforms.

Achieving high performance teaching and learning on a broad scale has proven to be a difficult challenge for many, many years and across many, many school settings at every level of education. The following factors contribute to the problem of limited learning, academic failure, and worse:

- Although the research literature, as illustrated in this volume, clearly identifies attributes of high performance or contextual teaching and learning, there nonetheless remains a persistent belief by many within and outside the education community that academic learning is largely an individual, often competitive, largely passive, and responsive activity. It consists far too often of decoding information, however well transmitted. Sadly, the primary learning tool for too many students is a yellow highlighter.
- Although teaching any subject well to groups of highly diverse learners is a complex and challenging endeavor, the extent of initial teacher preparation to acquire these abilities and understandings is modest by any standard. Preservice teacher education across the United States encompasses a relatively brief period of professional preparation. Beyond this there is nominal attention to how teachers are socialized and supported in their critical early years of teaching in a manner *consistent* with their initial preparation. Teachers in many other countries engage in much more intensive and sustained preparation including

lengthy internships in schools after completion of their preservice programs.

- Although learning in school is greatly enriched when it is both applied to and derived from various contexts outside of school—including the home, the community, and the workplace, these linkages simply are not made often enough.
- Although classrooms tend to have 1 teacher and 25-30 students, the proposed solutions to improved learning tend to focus on *individual* teachers and assessment of that individual's effort and ability. There is limited exploration of new teacher roles and responsibilities, especially as teachers work collaboratively with one another and other educational professionals.
- Although many exemplary materials and activities have been developed by accomplished teachers, sometimes working with researchers and developers, there is no mechanism for getting these in the hands of a great many other teachers in any systematic manner, in an ongoing *redesign* process. Each teacher is left to discover "best" practices largely on his or her own or to work primarily with textbooks that are quickly outdated and limited in their capacity to engage youngsters in *active, applied* forms of learning.

From this perspective it is difficult to overestimate the magnitude of the problem that exists relative to achieving improved teaching and learning on a large scale. The problem of limited learning is not just confined to the tens of thousands of youngsters who do not succeed academically or to those youngsters who for a variety of reasons tragically drop out of school and as a result commonly suffer major long-term negative consequences. The problem is also grounded in the reality that, although many youngsters succeed in school, they nonetheless develop little capacity to engage in complex learning or problem solving once they leave school. They resemble reservoirs with a dwindling capacity and without the means to replenish themselves. They have managed to achieve in school but without learning how to continue to learn over time. They lack the experience, skill, and often interest in working in the mutual, collaborative activities that define so much of everyday life. This is especially so regarding their ability to interact effectively with individuals who are unlike those with whom they grew up. Again, I remind the reader of Lauren Young's forceful reminder: What is currently at stake is *not* (emphasis mine) just the narrow view of academic achievement as school mission but a school preparation that embraces DuBois's (1903) goals of work, culture, and freedom (p. 147 in this volume).

As the earlier chapters have amply illustrated, the richness and depth of our learning is greatly influenced by both the nature of the individuals with whom we interact and the manner in which we interact with them while engaged in various learning activities both in and *outside* of school. Social climate, cultural understanding and sensitivity, and the continuing application and adaptation of activity in school to activity in the community and workplace are powerful mediators of cognitive functioning and "academic" learning and of acquiring the skills and habits of the lifelong learner. The *context* that defines where and how learning occurs is critical.

Each of these problems needs to be addressed through a major coordinated reform agenda that engages stakeholders across the PreK-16 education sector. I reiterate the argument made in chapter one that recruiting, preparing, and retraining good teachers is the *central*—but hardly the sole—strategy for achieving the nature and quality of instruction portrayed in this volume. Certainly, teacher preparation will not substantially change teaching practices unless it is guided by a bold and ambitious conception of instruction, as exemplified in contextual teaching and learning (CT&L).

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What are the needed strategies for responding to these problems? Recent scholarship is helpful here. Newmann and Wehlage (1995) identified four essential ingredients to achieving successful educational reform: (1) a vision of high-quality student learning, (2) significant changes in teacher practice directly related to that vision, (3) enhanced school organizational capacity, and (4) external support. This contextual teaching and learning project and the chapters in this volume have portrayed a vision of *high-quality learning* referred to as contextual teaching and learning. In terms of factor two, *significant changes in teacher practice*, this chapter examines how the nature of preservice teacher education has to be reconceptualized so that it relates more centrally to school renewal and contributes more directly to *contextual* teaching and learning. Strategies for doing this include rethinking priorities in preservice teacher education, changing the teaching practices of teacher educators themselves, and extending teacher education into the early, formative years of teaching in *partnership* with K-12 school personnel. In terms of the third factor, *enhanced school organizational policies*, these strengthened partnership arrangements would pilot new teacher roles for both novice and veteran teachers. We need to break out of current staffing patterns and limiting teacher roles. Teacher preparation needs to be reconceptualized in order to achieve PreK-12 school organizations that will enhance learning for *teachers* as well as students. At the end of this chapter, I address the fourth factor, *external support*, and illustrate how these interrelated reforms can be supported by a national network of partnerships designated to put in place a needed educational *redesign* process parallel to that which can be found in other advanced research and development endeavors. A coordinated national strategy of extended support is needed for "going to scale."

How the Nature of Teacher Education Shapes PreK-12 Schools and School Renewal

When thinking about the needed reform in teacher preparation, it is important to be clear about what constitutes good schools generally, just as we have tried to be clear in this volume about what constitutes good teaching and good learning. They are the guideposts for the reform of teacher preparation. There is no simple template for the good school. As do the good teacher and the good student, a good school has the capacity for self-renewal over time. At the core of such schools are school cultures that enable and reinforce learning for everyone. Such schools tend to be characterized by high degrees of collaboration at every level, and they can rightfully be called learning "communities" or learning organizations. Little (1982) was one of the first scholars to define the construct of teacher collaboration, identifying four critical practices:

1. Teachers engage in frequent, continuous, and increasingly concrete and precise talk about teaching practice.
2. Teachers are frequently observed and provided with useful (if potentially frightening) critiques of their teaching.
3. Teachers plan, design, research, evaluate, and prepare teaching materials together.
4. Teachers teach each other the practices of teaching. (p. 332)

However, such critical practices simply are *not* the norm in most schools. The question of how these teaching practices can be manifested on a continuing basis deserves more attention. School reformers today increasingly talk about "reculturing" rather than restructuring as they attempt to achieve these more collaborative and professional school cultures. What they have found, however, is that one cannot change school cultures easily, because cultures are driven by fundamental *beliefs*. Thus, changing a school culture means changing teacher beliefs, a complex challenge and a process that needs to begin in *initial teacher preparation*.

A basic premise of this chapter is that we need teachers *entering* the teaching force who embrace a bolder vision of teaching and learning and the mission of schools than do most teachers today. Further, these teachers must be prepared and disposed to work collectively with others to if this bolder vision of teaching and learning is to be put into practice. They must *believe collectively* that they can and should engage in such instructional practices. There is indeed a direct and causal link between how teachers are prepared and what eventually transpires in school. Current school cultures and school organizations reflect how teachers are prepared at present. More ambitious conceptions of learning, and correspondingly teaching, need to be fostered at the outset of a teacher's career. If this is not the situation, changing conditions in schools, such as block scheduling for release time for teachers to work together, will have but limited impact, as has been demonstrated. Bold new teaching strategies change the structure of schools but changing the structure of schools does not result in bold new teaching; teachers need to be *prepared* to teach in this manner.

Teacher preparation as the core strategy for reform will be greatly marginalized, however, *if* best practices in schools are not continually informing teacher education (and other educator preparation) and *if* the way teachers are prepared does not result in *new* and *better* organizational patterns, new teacher roles, and more collaborative professional cultures in schools. Thus, teacher education, more than ever, must be a *partnership* activity between schools of education, school districts, and teacher unions. Neither can these partnerships be the ad hoc peripheral endeavors so common now. Strong and lasting partnerships call for joint planning and mutual decision making around budget and staffing. First, however, the central and critical relationship between the nature of initial teacher preparation and the nature of school renewal needs to be underscored if more genuine partnerships are to evolve.

Next Steps in the Reform of Teacher Education

How can the large, uneven enterprise of teacher preparation be improved?

1. We need to rethink fundamentally the nature of preservice teacher preparation and establish priorities for what can and should reasonably be done in what is now construed as preservice teacher education and what would better be learned in the critical initial years of teaching. We attempt to do too much in what is now construed as preservice preparation and hence often do it badly.

2. We should establish *intensive* professional development with specific incentives and rewards for those who presume to be teacher educators (both those on campus and in PreK-12 schools) in order to improve the nature of their teaching substantially, since teachers *do* teach as they are taught.

3. Through legal, political, and economic means, we need to address how teacher preparation can become a more collaborative endeavor with a greater investment by local districts and practicing professionals in both the initial and critical entry-year aspects of teacher education.

4. We need to rethink the very role and responsibilities of many teachers, especially as our view of teaching and learning changes. Thus, we need teacher education programs to pilot and test *new* teacher roles. These new teacher roles should be more specialized and complementary to one another in order to achieve collaborate school cultures where more complex teaching and learning can occur. Partnership lighthouse schools should be instituted where new staffing patterns can be experimented with and evolve as a result of these new roles. These new staffing patterns will be designed to accommodate the education of teachers at different stages of their careers as well as, of course, their students.

5. We need coordinated external support to sustain these local reforms.

Rethinking the Mission and Character of Preservice Preparation

Contextual teaching and learning can profoundly influence the character and quality of preservice teacher education. First, it can serve as the conceptual framework for guiding a coherent set of instructional activities throughout preservice education. A clear conception of teaching, learning, and learning to teach communicates to faculty and students alike what is expected of them. It can convey either a pedestrian, narrow, and technical view of teaching and learning or it can communicate the dynamic vision embraced in CT&L. High-quality programs of teacher preparation have well-explicated conceptual frameworks and a limited number of distinctive themes that derive from that framework and that tie core activities in the program together in a coherent fashion (Howey and Zimpher 1989). A program takes on coherent and thematic properties when the key understandings and abilities desired for prospective teachers are engaged in by these novices developmentally over time in a variety of activities including campus courses, laboratories and clinics, community experiences, the workplace and, of course, PreK-12 classroom activities.

In a well-explicated vision of contextual teaching and learning, the prospective teacher would engage in repeated activities over time to expand and refine their understandings and abilities relative to such core pedagogical activities as knowing how to monitor and manage their learning alone and with others; representing and solving complex problems with others; designing learning activities sensitive to matters of equity and diversity; blending assessment in an ongoing formative fashion with teaching and learning activities; and engaging in and designing instructional activities that regularly have applications to the home, the community, and the workplace. Contextual teaching and learning has to be manifest in every aspect of the prospective teacher's preparation. Repeated activities designed to acquire the core understandings and abilities represent the thematic "lived" curriculum of teacher preparation. Linkages between learning in school and applications in the home, community, and workplace need continually to be made. The types of working relationships outlined by Wade, Lynch, and Harnisch in earlier chapters will need to be established over time. Curriculum guides and instructional materials that demand that PreK-12 students repeatedly apply their learning in school to a variety of activities in school contexts are needed.

From this perspective, whether such a bold and ambitious conception of teaching and learning emerges on a broad scale will depend very much on (1) how priorities in what is now construed as preservice teacher education are established and (2) how teachers are socialized and prepared to work with others. This *contextual* orientation to teaching and learning calls for teachers who are prepared and disposed to work closely with others. Beyond that, in the already crowded curriculum of preservice preparation, the emphasis cannot be on just the acquisition of core teaching abilities but also on core strategies for *learning to teach over time*. This is essential. The complex understandings and abilities embedded in CT&L simply cannot be acquired easily or quickly and certainly not in the abbreviated programs that now pass for teacher preparation. Although beginning teachers obviously need to acquire a repertoire of basic teaching skills at an *entry level*, these skills will need to be refined and extended over time through the development of a related repertoire of learning-to-teach strategies. A rapid learning curve will occur for teachers in the early years of teaching, *if*—and this is a big if—they have been both prepared and socialized to continue to learn with and from their colleagues and have specific strategies for doing so. Thus, during preservice preparation, short-term preservice teacher cohort arrangements lasting days, weeks, or even months can contribute to novice teachers' ability to plan, teach, inquire, and solve problems *together*. The guiding image of a teacher is that of an increasingly skillful problem solver over time and a member of a learning community. These learning to teach strategies call for prospective and beginning teachers continuing engagement in the following activities:

- Teaching clinics
- Case development and analysis
- Child study methodologies
- Examination of student work as a guide for further teaching decisions
- Analysis of teaching/learning activities from multiple perspectives and employing a variety of conceptual lenses
- Variations on action research
- Classroom and school organizational audits and problem-solving strategies

What is essential then is that prospective teachers have both a core set of instructional strategies—grounded in this concept of CT&L—*and* also a complementary array of strategies for refining and extending these with their colleagues over time. The idea of a preservice teacher graduating f rom a program as a "finished" product prepared to work largely independently as a new teacher is simply wrong minded and too often results in poor educational practice if not malpractice.

Changing the Nature of Teaching by Those Who Teach Teachers

Just as it is imperative that we enculturate and prepare PreK-12 teachers differently at the very outset of their careers, we should also rethink the preparation of the educational professionals who prepare these novice teachers. The position taken here is that the development of high-quality teaching skills should be as central a goal for *teacher educators* in their doctoral preparation as are developing the abilities to design and conduct scholarly inquiry. Just as doctoral programs are now characterized by core studies in research design and methodology, doctoral programs should incorporate *core* experiences that focus squarely on the development of more potent teaching abilities such as envisioned in contextual teaching and learning.

These core doctoral experiences should be characterized as much by the nature and quality of their teaching and learning as by the relevance of their subject matter. This core should be analogous to the scope and sequence of courses or a set of experiences that a doctoral student pursues in acquiring the understandings and abilities to conduct rigorous scholarly inquiry. Prospective teacher educators need to engage in a parallel but even richer set of instructional activities to those suggested for prospective teachers. That is, they need to know how to manage and monitor their own learning alone and in groups, they need to know how to design learning activities that are dynamic and call for continuing application of a problem-oriented nature in contexts beyond the classroom, and they need to know how to engage in assessment of their own learning in an ongoing manner employing various forms of documentation, including portfolios.

In summary, teacher educators need a very different type of preparation themselves and they need to be supported in the early years of their teaching as a teacher educator, just as beginning teachers need support and consultation. Beyond that, once a new generation of teacher educators evolves, incentives, rewards, and supporting structures need to be installed to support them in pursuing this more complex instruction. There should be peer review of course syllabi as examples of scholarly inquiry. There should be periodic peer collaboration in teaching and peer examination of teaching. Perhaps most fundamentally, teacher educators should engage in multiple forms of assessing the impact of teaching on their students' learning, as is being advocated for PreK-12 teachers. A basic change in the preparation of *teacher educators* is a corollary, if not a precondition, to changes in the preparation of teachers themselves.

Campus-based teacher educators will also have to teach periodically in K-12 schools and in classrooms and community contexts representative of those classrooms for which they are preparing teachers. If veteran teachers are willing to engage in rigorous assessment of their teaching abilities over time in order to acquire certification as accomplished teachers by the National Board for Professional Teaching Standards (NBPTS), so too should those who profess to teach teachers engage in a similar assessment.

Teacher preparation should *not* be turned over to schools and viewed largely as craft apprenticeship as some advocate. Teaching *is* an art but one that is increasingly informed by theory and research as the papers in this volume amply illustrate. We do, however, need the wisdom of practice integrally involved in teacher preparation. Accomplished veteran teachers need to be integrated much more fully into the education of prospective and beginning teachers, and much more attention needs to be paid to their selection and preparation for such roles. To serve effectively as teacher educators, these consulting teachers should engage in additional preparation with a focus on contextual teaching and learning and *how to promote this in others* as a cornerstone of this preparation. This author would argue that they should be credentialled for this important responsibility and have respected titles such as consulting teachers. They should receive compensation for this important role and have a portion of their teaching responsibilities redirected in order to work with ether preservice or beginning teachers in a sustained manner. This will call for major changes in policy at the state level and for new contractual language and negotiations between schools of education, local districts, and teacher unions. These are major changes from what exists at present and this brings us to a third major recommendation.

Extending Teacher Education in a Seamless Fashion into the Formative First Years of Teaching

In order to acquire the complex skills and understandings embedded in CT&L, **teacher preparation should not only be better but more protracted over time as well**. Further, this preparation should be designed to prepare teachers to assume a more reasonable scope of responsibility while working in concert with other teachers and educational professionals.

During at least the first year of teaching, the beginning teacher should have a reduced load and be assigned a veteran consulting teacher and/or professor to assist them. The recent report of the National Commission on Teaching and America's Future (1996) underscored the limited duration of teacher preparation in this country when compared with that in many other countries, countries where for some time now students taught by teachers prepared in this manner generally surpass our students on common measures of achievement. There is some modest headway in this regard. For example, the National Education Association (NEA) recently endorsed further experimentation with Peer Assistance and Review (PAR) programs in the first years of a teacher's career. However, these PAR programs typically do not go far enough. It is essential that these entry-year or transitional programs be primarily *educative*, consistent with, and derived from programs of *preservice* preparation that are guided by the ambitious view of teaching and learning promulgated herein.

The operating assumption is that such entry-year programs would lead to discernibly better instruction for the many youngsters in the classrooms where beginning teachers are typically assigned without such support and often in the most challenging of school settings. Is it reasonable to expect the same quality of instruction from a first-year teacher as from more experienced teachers? Support for these entry-year extensions of preservice and for differential teaching assignments initially derive from studies that find major differences generally in both diagnostic and planning abilities, as well as classroom performance, between veteran and novice teachers (Shulman 1987).

The rationale for entry-year programs resides primarily in the amount of time and type of context needed to acquire complex teaching understandings and abilities and in the quality of instruction afforded students in first-year teachers' classrooms. However, additional arguments can be made for the structured and sustained education of these new teachers through at least their first year of their teaching. Such extensions of teacher education, for example, are also a means of improving the retention of many outstanding veteran teachers who, at the peak of their careers, want to teach but have aspirations beyond classroom teaching. Nonetheless, they often leave the profession because there are no viable alternatives in this regard. In this seamless form of teacher education for beginning teachers, they can combine teaching with the role of consulting teacher.

Nowhere is the absence of enlightened teacher education policy and coordinated partnership action more obvious than during these critical first years of teaching. Yet, it is this critical juncture in a teacher's career that contains the greatest potential for forging needed partnerships between higher education and the PreK-12 sector. Focusing on this entry year allows (1) needed changes in and extensions of initial teacher education, (2) viable career options for many outstanding veteran teachers, (3) experimentation with new staffing patterns conducive to collaborative school cultures and learning communities, and (4) a visible bridge between how teachers are prepared and schools are organized.

Inventing New Teacher Roles and Building New School Cultures

Distributed cognition was one of the three themes revealed in the review of contemporary theories of cognition by Borko and Putnam in an earlier chapter. They reminded us that in the world outside of schools, intelligent activities are typically collaborative rather than solo performances. A major constraint of effective practice in both K-12 schools and teacher preparation is the broad scope of responsibilities assumed by many teachers, especially elementary teachers. Teachers of young children are asked to teach multiple subjects competently along with assuming a range of other functions including planning and materials development, continuing student assessment, home and community involvement, and continuing engagement in their own professional development. Although many secondary teachers have fewer preparations, they nonetheless also typically have minimal interaction with and support from other teachers and professional educators.

A realistic division of labor or distribution of expertise is the foundation for collaboration and the wellspring for collective self-renewal. The team-teaching arrangements common in this country in the 1960s and 1970s floundered and eventually faded because they were not, in fact, examples of team teaching but rather limited forms of joint planning. These earlier reform initiatives were severely constrained because teachers had all been fundamentally been prepared in the same manner and with the same extended range of responsibilities. Thus, already extended teacher roles became even more extended and compromised in these "teaming" arrangements.

The position taken here is that, over time, school-based leadership teams composed of individual teachers with *differentiated* roles and responsibilities would contribute greatly to achieving the more ambitious forms of teaching and learning envisioned in CT&L. There is a range of specialized roles that teachers can assume while still maintaining *primary* instructional responsibilities with youngsters. Teachers assuming these roles would typically go through a rigorous selection procedure and receive additional, intensive *preparation* for their new leadership responsibilities. Some examples of possible leadership responsibilities for teachers include new roles where they would have more specialized ability to do the following—

- Evaluate professional practice
- Integrate information and communication technologies
- Engage parents and community
- Design and carry out learning activities in the community and workplace
- Improve professional practice
- Develop standards-driven and performance-based instructional materials
- Help students learn with and from one another

In summary, there should be a fundamental rethinking of how preservice teachers generally are socialized and enculturated at school sites in order to work together more collaboratively and teach more publicly in front of their colleagues. Beyond this, various new teacher leadership roles should be explored for veteran teachers and more attention given to a better division of labor across teachers at school sites that will allow *all* teachers to teach in a more efficacious manner. Consulting veteran teachers working with beginning teachers represent a first step in this direction.

Professional Development or Partnership Schools have become commonplace, primarily as vehicles for the improved preparation of new teachers. In order for variations of CT&L to be implemented on any large scale, partnership schools should enable teachers, working together in a variety of "team" arrangements, to plan, design, implement, and evaluate such instruction. We have to "break the mold" of individual and largely independent teachers teaching mostly in private and mostly in the confines of "their" classroom with groups of 25-30 youngsters. We need to begin to break this mold in preservice preparation. Professional Development or Partnership Schools could experiment with many variations on how educational personnel can best be organized to "provide" instructional services. In a more seamless approach to teacher education, beginning teachers would spend their first years on teams composed variously of "intern" teachers, "resident" teachers, classroom teachers, specialized teachers, and lead teachers who are simultaneously exploring how better to socialize and educate teachers and how better instruction can be afforded youngsters.

The nature of teachers' roles and responsibilities and how teachers best interact with one another to provide optimal instruction are concerns that have been largely ignored in teacher education but they are a major factor to consider. As a result, there are serious problems in how educational services are provided. As evidence of this, Darling-Hammond (1994) reported that by 1991 almost half of public school staff were *not* teachers (47%). Surely, this signals major problems both in terms of achieving the fuller professionalization of teachers and in the efficient, effective "delivery" of instructional services and improved instruction, namely the achievement of contextual teaching and learning. We need more educational personnel cooperating at the *school* site and serving as liaisons with the community and the workplace.

Thus far, this chapter has attempted to address the first three factors essential to educational reform as identified by Newmann and Wehlage (1995). First, it has reiterated a clear vision of *high quality* *student learning* that has been referred to throughout as contextual teaching and learning. Second, it has examined at some length the implications of this construct of teaching and learning for major changes in initial *teacher preparation*, including a more seamless extension of teacher education into the formative early years of teaching. Third, it has addressed the issue of improved *school organizational capacity* by suggesting revised responsibilities for *all* teachers and new leadership roles for a number of accomplished veteran teachers. The latter is very much viewed as a partnership *teacher education* priority. This leaves the fourth key factor that enables educational reform, the question of *external support*.

External Networks to Support Local Reform

This author has had considerable experience in directing a *national* network of reform-minded partnerships intended to provide external support to *local* teacher education reform initiatives. When functioning at a mature level, such networks can provide the following kinds of assistance to local partnership sites:

- Serving as a catalyst for change
- Providing high-quality resources.
- Affording multiple opportunities for demonstration of exemplary practice through observations and exchanges across sites
- Allowing faculty members from one institution to serve as external auditors or critical friends at another
- Assisting in the further testing and coordinated development of instructional materials across sites
- Enabling a *program* of development and research, as opposed to isolated studies at each site
- *Collectively* influencing social and educational policy relative to teacher education and school reform

The Office of Vocational and Adult Education and the National School-to-Work Office are attempting to advance a bolder and more efficacious form of teaching and learning that has major implications for how teachers would be educated in future years and to promulgate such practice on a *broad scale*. Reform-minded networks such as the Holmes Partnership and the Urban Network to Improve Teacher Education (UNITE), represent cooperative arrangements among colleges and schools of education, school districts, and teacher unions across the country who are committed to advancing such teaching practices and to promoting needed changes in teacher education to achieve them. National reform networks such as these can provide a stronger and more coordinated *redesign* process that allows key elements of contextual teaching and learning to be tested in a rigorous manner across several sites. These networks, for example, could—

- Develop a means of identifying "best CT&L practices" integrated into teacher education across sites, with some supporting student achievement data;
- Support the further refinement of CT&L materials and procedures at those sites employing state-of-the-art design principles so that they are adaptable to other sites;
- Draw on teacher/professor developers who would further test and adapt these CT&L materials across multiple sites in the network; and
- Promote, on a broad national scale, the use of these high-quality instructional materials and proven instructional procedures.

As Pogrow (1996) has suggested:

> We no longer need colleges composed largely of individuals and courses that too often spread the latest incarnations of unworkable myths. Rather, we need organizations that can integrate research and philosophy with the development and large-scale testing of new technologies [read ambitious forms of teaching and learning]. Such organizations would have fewer courses and far more joint-development ventures involving university faculty members, students, and practicing professionals. Teachers and students could work together to design interventions and collect data on their effectiveness. This would force faculty members to confront the limitations of their ideas and subject them to review by those who must implement them. (p. 662)

Summary

In this final chapter I have tried to suggest how CT&L might be advanced by first reviewing constraints to the present implementation of this concept and then suggesting an interrelated set of strategies to respond to these constraints. The suggested strategies include—

- Interpreting CT&L throughout preservice teacher preparation in a thematic and coherent manner;
- Making the link between teacher preparation and school renewal more salient by preparing teachers who know how to

refine and extend their instructional repertoire over time and who are socialized to learn with and from their colleagues;

- Rethinking how teacher educators themselves are prepared and enculturated over time; and
- Seamlessly extending teacher education into the initial years of teaching.

A corollary to these strategies was an emphasis on achieving more realistic and complementary roles for all teachers while experimenting with various teacher leadership roles that could provide the basis for new, more flexible staffing patterns where teachers can plan and teach together effectively. Finally, national networks of partnerships were discussed as a strategy for promoting local reform, holding these local collaboratives to higher standards of accountability and testing and disseminating the best of our practices and materials across many, many sites or going to scale. The intent in this set of interrelated teacher education strategies is ultimately to achieve the type of preparation envisioned by Pogrow and the type of instruction known as contextual teaching and learning.

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Contextual Teaching and Learning Annotated Bibliography

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Adams, M., Bell, L. A., and Griffin, P. (1997). ***Teaching for diversity and social justice: A sourcebook***. New York: Routledge.

Social justice education (SJE) aims to teach students to critique current social relations and to envision more just and inclusive possibilities for social life. Five principles have evolved from SJE practice:

1. Balance the emotional and cognitive components of the learning process
2. Acknowledge and support the personal (the individual student's experience) while illuminating the systemic (the interactions among social groups)
3. Attend to social relations within the classroom
4. Use reflection and experience as tools for student-centered learning
5. Value awareness, personal growth, and change as outcomes of the learning process.

These principles stress attention to both the teaching and learning context of the classroom and the social context of diverse students. The design of SJE courses should be scaffolded by the following elements:

- Preassessment (identifying relevant characteristics of students and developing appropriate goals)
- Matching the environment to student learning process
- Structuring content
- Sequencing

- Accommodating a variety of learning styles;
- Making adjustments as the class unfolds

Because education is not a neutral activity (particularly SJE), teachers must know themselves as instructors as well as know their students.

American Psychological Association (1995). ***Learner-centered psychological principles: A framework for school redesign and reform.*** Washington, DC: American Psychological Association. (ERIC Document Reproduction Service No. ED 411 493)

The American Psychological Association has identified 14 psychological principles pertaining to learners and the learning process. The principles focus on psychological factors that are primarily internal to and under the control of learners rather than conditioned habits or physiological factors. The principles, which are intended to deal holistically with learners in the context of real-world learning situations, deal with the following: nature of the learning process; goals of the learning process; construction of knowledge; strategic thinking; thinking about thinking; context of learning; motivational and emotional influences on learning; intrinsic motivation to learn; effects of motivation on effort; developmental influences on learning; social influences on learning; individual differences in learning; learning and diversity; and standards and assessment. The six standards addressing cognitive and metacognitive factors are as follows:

1. The learning of complex subject matter is most effective when it is an intentional process of constructing meaning from information and experience.
2. The successful learner, over time and with support and instructional guidance, can create meaningful, coherent representations of knowledge.
3. The successful learner can link new information with existing knowledge in meaningful ways.
4. The successful learner can create and use a repertoire of thinking and reasoning strategies to achieve complex learning goals.
5. Higher-order strategies for selecting and monitoring mental operations facilitate creative and critical thinking.
6. Learning is influenced by environmental factors, including culture, technology, and instructional practices.

Ames, C. (1990). "Motivation: What teachers need to know." ***Teachers College Record***, 91(3), 409-421.

Although motivation is one of the foremost problems in education, it is often inadequately addressed in foundational education courses. Teachers need to consider how motivation constructs, such as self-worth, attributions, and achievement goals, relate to each other, to developmental changes, to individual and culturally related differences, and to the context or structure of the classroom itself. Too much time is spent discussing individual differences in motivation, treating motivation as a trait, and not enough time attending to how the organization and structure of the classroom shapes and socializes adaptive and maladaptive motivation patterns. For example, work on intrinsic motivation suggests that children be given choices and thus a sense of personal control in the classroom. But when normative evaluation and public comparison are expected, students' choices may reflect an avoidance of challenge and a preference for tasks that ensure success. Developing a positive motivational orientation in students also necessitates dealing with the diversity of students in the classroom.

Ayers, W., Hunt, J. A., and Quinn, T. (Eds). (1998). ***Teaching for social justice***. New York: New Press and Teachers College Press.

Teaching for social justice is at the core of democratic education. Schools most likely to be hospitable to teaching for social justice are geared to active learning, to students' authentic questioning, and journal keeping. They are constructivist, in the sense of encouraging students to find or construct meaning rather than to go in search of meanings already predefined. To teach for social justice arouses the kinds of vivid, reflective, experiential responses that might move students to come together in serious efforts to understand what social justice actually means and what it might demand. Teaching for social justice is to teach for enhanced perception and imaginative explorations, for the recognition of social wrongs. The challenge for schools with a democratic mission is to structure curriculum activities that advance these goals while simultaneously supporting systematic and sequential development of disciplinary knowledge. If the desire and capacity to respond to social needs are prerequisites for participatory democracy, students need to have experiences that develop this orientation and foster these abilities. In addition to traditional academic discipline-based goals, preparation for participatory democracy requires that young people develop both a spirit of service and the skills needed for effective civic action. The policies and practices of teachers, schools, and districts can promote or constrain the degree to which students acquire the knowledge, skills, and attitudes necessary to function effectively as citizens in a democracy. An education that promotes participation, critical analysis, and action is a pedagogical prerequisite for democracy.

Bailey, T. R. (Ed.). (1995). ***Learning to work: Employer involvement in school-to-work transition programs.*** Washington, DC: Brookings Institution.

Proponents of contextual learning argue that individuals learn skills more effectively if what they learn has a close relationship with their everyday activities. As a form of contextual learning, work-based education (WBE) offers crucial cognitive benefits, creates necessary institutional linkages between schools and workplaces, provides a unique motivation for students to learn, and can promote the maturity and behavior needed to be an effective worker. Interest in WBE programs emerges from two concerns: the workplace has changed and is demanding new and different skills and schools have failed to meet the challenge of teaching those skills. WBE exists in many established and relatively new forms, including the following: school-to-work, cooperative education, high school academies, tech prep, occupational-academic clusters, and youth apprenticeship. Despite WBE's attractiveness as an educational strategy, structural problems within schools and practical barriers to employer participation have kept it from spreading as rapidly as might be expected. Incorporating work-based components into mainstream education requires the following actions: changing school scheduling patterns; reforming the ways teachers work together; redesigning teacher preparation and professional developments; altering college admission policies to recognize work experience; explaining how participation in WBE benefits employers; and giving employers a range of options for participating in WBE (including options that only require a commitment of time, such as giving advice on instruction, curriculum, and assessment or donating materials). Carefully designed school-based work experience programs (for example, school-based enterprises) are another way of contextualizing learning and helping students make the transition from school to work.

Bailey T., and Merritt, D. (1997). ***School-to-work for the college bound.*** Berkeley: National Center for Research in Vocational Education, University of California. (ERIC Document Reproduction Service No. ED 405 476)

The pedagogical arguments used to support school-to-work (STW) apply to all learning, including learning for college-bound students. STW has three basic elements: "learner-centered" or "authentic" teaching and learning; guided educational experiences outside the classroom, particularly in the workplace; and a structured approach to help young people think systematically about their aspirations and how they can achieve them. Authentic learning involves three components: construction of knowledge (students construct knowledge by organizing, synthesizing, interpreting, explaining, or evaluating information); disciplined inquiry (students use an established knowledge base in an attempt to develop an in-depth understanding of problems); and value beyond schooling (authentic achievements must have aesthetic, utilitarian, or personal value beyond showing teachers, parents, colleges, or employers that the student has mastered the requirements of schooling). Guided educational experiences that occur not in classrooms but rather in the context where the skills being taught will be used (for example, in the workplace) may include internships and apprenticeships and experiences requiring even less of employers (for example, job shadowing, mentoring relationships with adults, community service activities, school-based enterprises, and in-school simulations of work experience). If STW programs are well planned, students can learn academic skills, earn high grades, score well on tests, and gain access to college. However, widespread acceptance of STW as a strategy for preparing students for selective colleges will require significant changes in assessment and college admission procedures. Assessments must be competency based and "authentic"; that is, they must include more complex materials, such as papers, projects, and portfolios.

Berryman, S. E. (1995). "Apprenticeship as a paradigm of learning." In W. Norton Grubb (Ed.), ***Education through occupations in American high schools. Vol. 1. Approaches to integrating academic and vocational education*** (pp. 192-213). New York: Teachers College Press.

Learning consists of both knowledge and skill. It requires not just content but also the capacity to use knowledge appropriately as a tool. Developing skill requires content acquired under conditions of use within learning situations that model the cognitive, social, and technological conditions where knowledge of that kind is used. The prevailing learning paradigm in K-12 education routinely violates many experience-, theory-, and research-based notions of what constitutes effective teaching. Apprenticeship is an alternative paradigm that promises to generate more effective learning for both college-bound and noncollege-bound students. Traditional apprenticeship, which is usually organized around visually observable practices that need to be learned, must be modified to make the nonvisible, cognitive components of modern activity (including work) visible for modeling and discussion. Traditional apprenticeships are not always entirely transferable to modern societies for two reasons. First, in many modern work and work-related practices, cognitive skills complement and are equal in importance to embodied knowledge. Second, traditional apprenticeship presumes relative constancy in the activities being learned. Cognitive apprenticeship modifies traditional apprenticeship to teach symbolically based, and therefore less observable, activities such as basic academic skills. As a strategy designed to entrain novices into communities of expert practice, cognitive apprenticeship ignores the usual distinctions between academic and vocational education. Although apprenticeship normally occurs in the workplace, cognitive apprenticeship can and should also occur in schools, with the optimal location for apprenticeship depending on issues such as the educational richness of the situation, whether it be school or work.

Collins, A., Brown, J. S., and Holum, A. (1991, Winter). "Cognitive apprenticeship: Making thinking visible." ***American Educator***, 6-11, 38-46.

In traditional apprenticeship, experts show apprentices how to do a task, watch as the apprentices practice portions of the task, and give apprentices increasing amounts of responsibility until the apprentices are proficient enough to accomplish the task independently. Traditional apprenticeship has four important aspects: modeling (apprentices observe their masters demonstrating how to perform different parts of tasks); scaffolding (the support that masters give apprentices in performing tasks); fading (masters slowly remove the support); and coaching (the thread running through the entire apprenticeship experience). Cognitive apprenticeships share these four features of traditional apprenticeship. Traditional and cognitive apprenticeships differ on three important counts. First, the tasks being learned in traditional apprenticeships are usually easily observable and completely situated in the workplace, and the skills to be learned are inherent in the task itself. In cognitive apprenticeship, on the other hand, the skills being learned are not easily observable; rather, they are abstract and often require that students be able to transfer what they learn. To translate the model of traditional apprenticeship into cognitive apprenticeship, teachers must do the following: identify the processes of the task and make them visible to students; situate abstract tasks in authentic contexts so that students understand the relevance of the work; and vary the diversity of situations and articulate the common aspects so that students can transfer what they learn. Studies have shown that cognitive apprenticeship may be used successfully to teach reading, writing, and mathematics to students at all instructional levels.

Doyle, W., and Carter, K. (1987). "Choosing the means of instruction." In V. Richardson-Koehler and D. Berliner (Eds.), ***Educators' handbook: A research perspective*** (pp. 188-206). New York: Longman.

Choosing the means of instruction is one of the most important and one of the most difficult decisions a teacher makes. In choosing instructional means, a teacher must use his or her knowledge about students, subject matter, resources, purposes, and classroom processes to define a pattern for organizing students to work with academic content. What a teacher knows is turned into practical procedures for accomplishing educational objectives in the time and space of a specific classroom. Means of instruction are classroom events for teachers and students. Such events organize the social dynamics of classrooms, embody the curriculum, guide student thinking about subject matter, and specify skills that students will need in their adult lives and work. Choosing the means of instruction for a class involves selecting activities as contexts to accomplish academic work. The choice, therefore, involves both social-organizational and academic task considerations. Instructional means define a program of action for teachers and students in classrooms. The management task of a teacher is to carry out this program of action in ways that maintain orderliness and provide students with opportunities for high-quality engagement with the curriculum. The means of instruction falls within the province of teaching methods. Teaching methods can take a variety of forms: lecture, recitation, discussion, questioning, small group work, independent study, review, programmed instruction, and computers. From this perspective, choosing the means of instruction is at the core of effective teaching.

Garcia, E. E. (1996). "Preparing instructional professionals for linguistically and culturally diverse students." In J. Sikula (Ed.), ***Handbook of research on teacher education, 2nd ed.*** (pp. 802-813). New York: Macmillan. (ERIC Document Reproduction Service No. ED 400 230)

The educational vulnerability of culturally diverse students must be understood within the broader contexts of students' life circumstances, both in and out of schools. Because children learn higher-level cognitive and communicative skills as they engage in socially meaningful activities, learning is enhanced when socioculturally and linguistically meaningful contexts are provided. However, these meaningful contexts are not generally available to culturally diverse students in schools that transmit a monolithic culture in practices such as the exclusion of students' cultural histories, languages, and values, and "tracking," which limits access to academic courses and learning environments. A new pedagogy envisions the classroom as a community of learners in which speakers, readers, and writers come together to define and redefine the meaning of academic experiences. Four interlocking themes of effective bilingual teachers are as follows: extensive and reflective knowledge, diverse instructional skills, dedicated dispositions, and positive affect with caring and high expectations for students. Reformed criteria in California for credentialing of teachers for linguistically and culturally diverse student populations attempt to incorporate the following knowledge and skill domains:

- Language structure and first- and second-language development
- Methodology of bilingual English-language development and content instruction
- Culture and cultural diversity
- Methodology for primary-language instruction
- The culture of emphasis
- The language of emphasis

Gomez, B. (Ed.). (1995). ***Integrating service-learning into teacher education: Why and how?*** Washington, DC: Council of Chief State School Officers.

Service learning, developed through community or public service, has begun to take shape within schools and colleges of education throughout the country. To prepare students for the increasingly complex roles that today's teachers must assume and to encourage them to see teaching as vitally connected to the larger social context, a growing number of colleges and universities are restructuring their teacher education programs to provide students with first-hand, service learning experiences. Those who effectively use the service learning process become successful teachers by understanding learning as a dynamic, social, real-life process; understanding themselves and their many roles as teachers; and understanding how to help their students grow as people and successfull earners. Service learning in teacher education increases teachers' instructional repertoires, engages teachers as reflective practitioners who critically examine methods of teaching and learning, cultivates an understanding of diversity among teachers, and nurtures moral leadership. Portraits of improved teacher education through service learning include Seattle University's initiative to establish

an ethos of community service and a commitment to service learning in graduates of its Master in Teaching program by developing and implementing a model that uses the knowledge base about effective methods of teacher development and incorporating recent constructivist perspectives; the University of Minnesota's teacher education course offerings in service learning; and, the College of Education at the University of South Carolina's initiative to incorporate a required service learning experience into the curriculum for all future teachers.

Goodwin, A. L. (1997). ***Assessment for equity and inclusion: Embracing all our children***. New York: Routledge. (ERIC Document Reproduction Service No. ED 411 345)

Student assessment is a critical aspect of the educational encounter. The most common method of assessment, defined primarily as standardized testing, has had a number of deleterious effects on schools, instruction, and children who are poor or minority. Assessment by standardized testing often labels poor and minority children in ways that exclude them from opportunities, while failing to measure their true potential. Consistent with education reform efforts, the latest education mantra is alternative assessment. This concept, examined from historical, theoretical, practical, and critical points, sheds light on best practices as framed by the decisions teachers make and the thinking in which they engage to explore perennial curriculum dilemmas that emerge from assessment. Diversity and equity, used as conceptual lenses, present multiple possibilities of innovative practices in the assessment of children and of teachers. The debate between standardized testing and alternative assessment methods suggests strategies of assessment that include rather than exclude students to create a diverse community of learners. Assessment, equity, and inclusion are inextricably entwined. Authentic assessment used as a tool for instruction defines the needs of each child. Getting closer to students, having access to what they can actually do, and seeing their learning over time are the challenges that many teachers have put before themselves as they explore portfolio assessment and the use of exhibitions of performance. These efforts to move beyond the unsituated tests that have been so dominant in the last several decades are beginning to take hold in increasing numbers of schools.

Greeno, J. G., Collins, A. M., and Resnick, L. B. (1996). "Cognition and learning." In D. Berliner and R. Calfee (Eds.), ***Handbook of educational psychology*** (pp. 15-46). New York: Macmillan.

The three major perspectives on cognition and learning within educational psychology are the behaviorist, cognitive, and situative. Of these three perspectives, the situative is the most recently developed, and it may be able to provide a synthesis of the two earlier perspectives. The situative view focuses on the activity systems in which individual agents participate as members of social groups and as components of larger systems in which they interact with material resources. The situative approach to knowing focuses on the way that knowledge is distributed in the world and the communities and practices in which individuals participate. Because thinking is situated in particular contexts of intentions, social partners, and tools, this approach emphasizes the need for more naturalistic learning environments. Learning is seen as the strengthening of practices and participation in communities. Individuals learn to participate in social practices in systems such as cognitive apprenticeships. Transfer of learning relies on the marshaling of resources needed for success in a new environment. Motivation in the situative approach focuses on engagement that maintains the person's interpersonal relations and identity in communities or involves satisfying interactions with valued environments. In the situative view, an important part of learning the concepts of a particular domain is learning to participate in the discourse of that community. The different family and community contexts of learners must also be appreciated. Curricula should focus on realistic problems that are worked out in meaningful settings of activity in which the contents of subject-matter disciplines are embedded.

Hamilton, S. F., and Hamilton, M. A. (1997, May). "When is learning work-based?" ***Phi Delta Kappan***, 78 (9), 677-681.

Work-based learning (WBL) can increase students' engagement in learning and prepare them for employment. The eight major types of WBL can be grouped into three categories: (1) visits to workplaces, including field trips and job shadowing; (2) work-like experiences, including service learning, unpaid internships, and youth-run enterprises; and (3) employment, including youth jobs, subsidized employment training, cooperative education, paid internships, and apprenticeships. WBL involves purposeful employment-related activity and occurs in locations where the primary activity is producing goods or services. WBL is not learning about work, learning how to work, or simulating workplaces in schools. WBL opportunities differ from the standpoints of their purpose, activities, connection with school, and the investment of time and other resources made by the employer and the young people. Each dimension may be realized on three successive levels of complexity or intensity. At level 1, WBL experiences are related to school, involve observation, and are conducted for purposes of exploration.

Level 2 WBL experiences are interdependent on school-based learning and help students develop personal and social competence by requiring them to perform routine tasks. At level 3, WBL activities are integrated with school-based learning, and they require that students plan, perform, and evaluate complex tasks, thereby developing technical competence. Educators should consider all eight types of WBL and try to provide a wide range of WBL activities in a manner that aligns purposes, activities, school connections, and investments and that systematically relates different types of WBL to one another as well as to schools.

Hamilton, M. A., and Hamilton, S. F. (1997, May). "When is work a learning experience?" ***Phi Delta Kappan***, 78 (9), 682-689.

Work-based learning (WBL) is a promising complement to conventional school-based learning and a key component of school-to-work opportunities systems. Its promise can be fulfilled, however, only if the WBL experience is of high quality. A successful 4-year youth apprenticeship demonstration project in which 100 students were apprentices in 3 occupations beginning in grade 11 was analyzed to identify principles that make WBL effective. The principles identified are as follows:

- Youths gain basic and high-level technical competence through challenging work.
- Youths gain broad technical competence and understand all aspects of the industry through rotation and projects.
- Youths gain personal and social competence in the workplace.
- Workplace teachers convey clear expectations to youths and assess progress toward achieving them.
- Youths learn from adults with formally assigned teaching roles.
- Youths achieve high academic standards.
- Youths identify and follow career paths.

The following steps were seen as the most critical to successful WBL: (1) restructure schools and workplaces (increase the breadth and depth of learning, ensure equal access to learning, assign staff to organize and monitor WBL, and maintain a learning organization); (2) form partnerships (partnerships with employers, other educators, the school system, legislators, government agencies, parents, youths, and community organizations); (3) build a school-to-work system (systems differ from schools in that they are inclusive, comprehensive, integrated internally, connected externally, and comprehensible); and (4) continue research and development to inform those practitioners who are designing and operating WBL systems.

Howey, K. R. (1996). "Designing coherent and effective teacher education programs." In J. Sikula (Ed.), ***Handbook of research on teacher education, 2nd ed.*** (pp. 143-169). New York: Macmillan. (ERIC Document Reproduction Service No. ED 400 230)

One of the major challenges is designing preservice education programs that engage students in pedagogically powerful ways, that is, in contexts that are conducive to learning to teach. The character of teaching and learning, which remains largely a lecture-recitation activity, must be transformed at all levels. Five assumptions examine what might contribute to more coherent programs of teacher preparation. First, programs need to be guided by a critical perspective addressing issues of social justice. Second, the nature of socialization provided to prospective teachers and the character of the pedagogy with which they interact and eventually take on need to be altered in a dramatic fashion. Third, programs of teacher preparation need to interact much more closely with PreK-12 schools. Fourth, the needed changes require considerable coordination and collaboration within the higher education community, as well as within the PreK-12 sector. Finally, teacher education must be extended relatively seamlessly into the early years of teaching. A triadic approach to program design and implementation is proposed: (1) the evolution of a defensible conceptual framework that grounds and guides a program, (2) the derivation of themes that provide continuity and coherence to the program, and (3) the development of socialization and educative experiences that allow the themes to be manifested and that have the power to educate prospective teachers in a more programmatic and potent manner. Additional contexts for learning to teach must evolve, including a range of pedagogical laboratories.

Howey, K. R., and Zimpher, N. L. (1996). "Patterns in prospective teachers: Guides for designing preservice programs." In F. Murray (Ed.), ***The teacher educator's handbook: Building a knowledge base for the preparation of teachers*** (pp. 465-505). San Francisco: Jossey-Bass. (ERIC Document Reproduction Service No. ED 394 902)

Current trends in preservice teachers indicate that the teacher of the future will be white and female; from a rural, small town, or suburban community; and have a conservative view of schooling. This indicates a need to attract more underrepresented populations into the teaching force and overcome teachers' desires to teach students with similar backgrounds to their own. The training of teachers should involve cognitive development and general pedagogical development. The seeds for the disposition to inquire continually into one's instructional practice and to support that practice with principled reasoning and with decisions that are data based and theoretically grounded need to be nurtured in pedagogical laboratories, teaching clinics, and through the use of instructional cases in campus settings. In terms of preservice teacher socialization, the development of learning communities and a focus on social contexts that promote not only cognitive abilities but the social development of students as well are essential. The contextual influence of varying college environments, from Ph.D.-granting universities to small, liberal arts colleges, also have a strong effect on the sophistication of graduates. Suggestions for purposeful socialization include short-term cohort arrangements involving students and faculty while they engage in professional study, research and evaluation teams of students, and arrangements set up for political action or critical inquiry. Preservice programs should also enable expert-novice interactions in developmental stages, beginning with observation and structured discourse between novices and veteran teachers, to videotaped self-analysis and reflection on their teaching, to engagement with veteran teachers with a focus on the novices' instruction.

Johnson, D. W., and Johnson, R. T. (1996). "The role of cooperative learning in assessing and communicating student learning." In T. Guskey (Ed.), ***Communicating student learning. 1996 ASCD yearbook*** (pp. 25-46). Alexandria, VA: Association for Supervision and Curriculum Development.

Schools seeking to reap the benefits of cooperative learning should adhere to seven assessment and reporting principles:

1. Begin the assessment process by formulating a plan that includes learning and instructional processes, outcomes to be assessed, and the setting in which the assessment will occur.
2. Understand and use the many benefits of cooperative learning groups in assessing the impact of instruction and communicating assessment results to interested audiences.
3. Avoid using groups that are not truly cooperative.
4. Ensure that groups are truly cooperative (that is, characterized by positive interdependence, individual accountability, face-to-face promotive interaction, and appropriate use of interpersonal skills and group processing).
5. Make all assessment practices an integrated whole that involves procedures before, during, and after instruction
6. Involve students, classmates, and parents in reporting assessment results.
7. Use cooperative learning groups to help individualize educational goals, learning processes, assessment procedures, and reporting procedures for gifted and disabled students.

In accordance with the fifth principle, various planning activities (including specifying objectives, designing the sequence of instructional tasks to achieve objectives, and establishing success criteria and a plan for assessing whether they have been met) are conducted before lessons. Assessment activities during instructional units include checking homework, conducting observations, assessing students' social skills, and interviewing students to determine their level of learning. Options for assessing student learning after instructional units have been completed include the following: paper-and-pencil achievement tests, peer editing, class presentations, portfolios, self- and other ratings, group products, group processing, and total quality learning.

Jones, B. F., Valdez, G., Nowakowski, J., and Rasmussen, C. (1995). ***Plugging in: Choosing and using educational technology***. Oak Brook, IL: North Central Regional Educational Laboratory.

Technology is being used in education as a tool for learning, collaboration, curriculum development, and staff development. The only real measure of the effectiveness of technologies and technology-enhanced educational programs is the extent to which they promote and support students' engaged learning and collaboration. This paper outlines a framework for evaluating the selection and use of educational technologies based on eight categories of engaged learning and instruction. The following categories particularly stress the importance of context. The task category stresses tasks that are authentic (pertaining to the real world). The assessment category stresses assessment that is performance based, generative, seamless and ongoing, and equitable. The learning context category focuses on instructing students as part of a collaborative community, learning experiences that are set up to bring multiple perspectives to solve problems and build knowledge, and empathetic environments that are set up to value diversity. The student roles category emphasizes students as explorers, cognitive apprenticeships, and students as teachers and producers of things of real use. Based on this framework of engaged learning, it is suggested that technology be evaluated on the grounds of access, operability, organization, engagability, ease of use, and functionality.

King, J. E., Hollins, E. R., and Hayman, W .C. (1997). ***Preparing teachers for cultural diversity***. New York: Teachers College Press.

In order for teacher preparation to address cultural diversity by developing the self-awareness of teacher candidates, it must provide learning experiences that go beyond merely adding special courses. Rather, programs need to emphasize having an integrated

process for teacher development that supports preservice teachers in acquiring the competence necessary for facilitating learning in a culturally diverse school settings and for working with pupils from diverse backgrounds. Common features of successful programs and practices include methods and experiences that enable preservice teacher candidates to expand their understanding of diversity, racism, social justice, and culturally responsive instruction. Thus, meeting the challenge of diversity is conceived not as enabling teachers to learn about exotic and diverse others, but rather in terms of teaching that is democratic, multicultural, and consistent with social justice values and purposes. This places needed emphasis on the capacities of teacher educators, on teacher preparation processes, and on society.

McCombs, B. L., and Marzano, R. J. (1990). "Putting the self in self-regulated learning: The self as agent in integrating will and skill." ***Educational Psychologist*** 25(1), 51-69.

Self-regulated learning (SRL) may be defined as the outcome of choosing to engage in self-directed metacognitive or cognitive, affective, and behavioral processes and skills. The role of the self as agent to the initiation, development, and continuation of SRL processes and behaviors is fundamental to SRL. Although a skill component can enhance self-regulation, it is not sufficient. Students' will or desire to engage in self-regulation is paramount. To generate the will for self-regulation, students must realize that they are creative agents responsible for and capable of achieving self-development and self-determination goals. Students must also appreciate and understand their capabilities for reaching these goals. Only then do self-regulation and the desire to enhance self-regulation capabilities follow. Integration of skill and will is therefore necessary in interventions designed to promote SRL. Efforts to promote SRL must be directed at two dimensions: the learner and the learning environment. In the learner dimension, the focus must be on two areas. The first is developing students' understanding that they are creative agents with the power of choice (will). The second is using metacognitive and cognitive information processing strategies (skill) to meet personal self-development and self-determination goals. In the learning environment dimension, efforts must be focused in two directions. The first is designing programs that equip teachers, administrators, and parents with the ability to maintain relationships and high-quality interactions that create climates of positive socioemotional support. The second is designing structures and content that fit the information, self-assessment, and goal needs that facilitate students' positive self-development.

National Commission on Teaching and America's Future. (1996, September). ***What matters most: Teaching for America's future.*** New York: Teachers College, Columbia University. (ERIC Document Reproduction Service No. ED 395 931)

The teaching profession suffers from years of neglect including slipshod recruitment; uneven teacher training; sink-or-swim induction of new teachers; and outdated systems for evaluating, rewarding, and developing teachers. Recommended changes include setting standards for teachers linked to higher academic standards for students, more rigorous preparation of teachers still in college, professional development for veteran teachers on the job, rewards for expert teachers, and improvement or removal of incompetent teachers. A more complex, knowledge-based, and multicultural society creates new expectations for teaching. Due to sweeping economic changes, today's world has little room for workers who cannot read, write, and compute proficiently; find and use resources; frame and solve problems with other people; and continually learn new technologies and occupations. Teacher quality is the factor that matters most for student learning. Extensive data demonstrate the connection between well-prepared teachers and student achievement. Studies show that, although teachers make the most profound difference in student achievement, poor and minority students are far less likely to have access to qualified teachers, a major reason for unequal achievement. Teacher education matters, and more teacher education appears to be better than less—particularly when it includes well-constructed, practical experiences interwoven with course work on curriculum, learning, and teaching. School systems provide too few teachers the opportunity to master fully the subjects they teach and to develop a range of teaching strategies that can reach all of their students.

National Commission on Teaching and America's Future. (1997, November). ***Doing what matters most: Investing in quality teaching***. New York: Teachers College, Columbia University. (ERIC Document Reproduction Service No. ED 415 183)

Teacher quality, the factor that matters most for student learning, has climbed to the top of the education reform agenda. The National Commission on Teaching and America's Future has forged alliances with leading education organizations to raise the quality of America's teachers. Teacher education matters when it includes well-constructed practical experiences interwoven with course work on curriculum, learning, and teaching. Redesigned teacher education programs (for example, those that offer a 5-year program including an extended internship), find their graduates are more successful and more likely to enter and remain in teaching than graduates of traditional undergraduate programs. States that

invested in teacher quality during the 1980s experienced the largest gains in student achievement during the 1990s. Their success stands in sharp contrast to other reforms that have been mandated without a corresponding investment in the skills of front-line teachers. The commission has been working with states on developing a common agenda that focuses on critical linkages between enhancing student achievement and a systemic commitment to sustained teacher development. The commitment to ensure that teachers meet rigorous standards, have access to high-quality professional development, receive salaries that emphasize and reward knowledge and skill, and work in schools that put more resources into classrooms is an investment that will pay long-term dividends.

Newmann, F. M., and Wehlage, G. G. (1993, April). "Five standards of authentic instruction." ***Educational Leadership***, 50 (7), 8-12.

Even the most innovative learning activities can be implemented in ways that undermine meaningful instruction. Innovations should aim toward a vision of authentic student achievement by attempting to meet three criteria: students construct meaning and produce knowledge; students use disciplined inquiry to construct meaning; and students aim their work toward production of discourse, products, and performances that have value or meaning beyond success in school. Before authentic student achievement is possible, two problems must be overcome: the work students do frequently does not allow them to use their minds well, and schoolwork frequently has no intrinsic meaning or value to students beyond achieving success in school. To overcome these problems, Wisconsin's Center on Organization and Restructuring of Schools designed a framework to help teachers and researchers identify the types of instruction that engage students in using their minds well. The framework consists of five standards of authentic instruction that are each evaluated on a five-point scale. The framework measures the following: degree to which students use higher-order thinking; students' depth of knowledge and understanding; extent to which the class has value and meaning beyond the instructional context; extent of talking to learn and understand the substance of a subject; and extent to which the activities provide social support for student achievement (high expectations, respect, and inclusion of all students in the learning process). The framework is currently being used to estimate levels of authentic instruction in social studies and mathematics in elementary, middle, and high schools.

Pate, P. E., McGinnis, K., and Homestead, E. (1995). "Creating coherence through curriculum integration." In Beane, J. A., (Ed.), ***Toward a coherent curriculum. 1995 ASCD yearbook*** (pp. 62-70). Alexandria, VA: Association for Supervision and Curriculum Development. (ERIC Document Reproduction Service No. ED 379 779)

Dissatisfied with the failure of traditional schooling to connect curriculum with the needs of students and teachers, three educators worked to develop an integrated curriculum that could serve as a vehicle for making schooling relevant to the outside world. The curriculum development effort included the following key steps: identifying goals, creating a democratic classroom; integrating content; making connections; using traditional and alternative assessments; determining appropriate pedagogy; personalizing learning; enhancing relationships; communicating; developing effective scheduling and organizational structures; and reflecting. Some of their goals were as follows: developing a curriculum that gives students and teachers a deeper understanding of content; making connections between school and the outside world; teaching students how to learn; encouraging students to accept responsibilities; learning to work effectively with a diversity of people; encouraging students to take risks and learn from mistakes; teaching students to become effective problem solvers; developing expertise in self-expression; and discovering that learning can be fun. All nine goals were addressed in a unit on human interactions that required students to research social issues of concern to them, keep journals, and construct their own alternative assessments. The unit was democratic in that students and teachers collaborated on the team management plan, grading policy, parent communication, and curriculum. In the unit, facts and skills from science, social studies, mathematics, language arts, and the fine arts were integrated into context of socially significant themes. Because the facts and skills were learned within a meaningful context, they began to take on real meaning for students.

Phelps, L. A. (1998). "Changing work, changing learning: The imperative for teacher learning in workplaces and communities." In ***Teacher learning in workplaces and communities.*** Madison: Center on Education and Work, University of Wisconsin. <http://www.cew.wisc.edu/ncrve/briefs/CHANGE.PDF> (ERIC Document Reproduction Service No. ED 417 348)

All teachers, counselors, and administrators in U.S. schools need experientially based, continuous learning opportunities if they are to optimize learning, career development, and school-to-work transition outcomes for their students. Teacher learning in workplace and community settings is essential in professional development systems and programs that aim to provide authentic leaning experiences beyond the school setting. Expanded experiential

learning for educators is a key component of several educational reform efforts, including efforts to develop new teaching standards. The case for expanding the scope and extent of teachers' workplace learning is also being driven by new evidence that students' academic achievement is advanced by work-based learning experiences. The following are key teacher-reported benefits of teacher participation in workplace professional learning:

- Enhancing school-community relations
- Locating real-world problems and illustrations of academic in the workplace
- Developing insights on performance assessment strategies
- Responding to community economic development needs
- Affirming and expanding teachers' views of the value of their knowledge and contributions
- Developing a clear understanding of the culture of work and community setting and their differences from educational cultures
- Updating technical knowledge and expertise
- Identifying career pathways or clusters that align with student interests and economic needs
- Identifying new approaches and strategies supporting continuous improvement in schools; identifying mentoring resources for students
- Identifying workplace accommodations for individuals with disabilities.

Administrators, teacher organizations, and policymakers can identify many useful models for transforming professional development opportunities for teachers by examining how business and community-based organizations are increasingly relying on continuous learning to improve employee performance.

Prawat, R. S. (1992). "Teachers' beliefs about teaching and learning: A constructivist perspective." ***American Journal of Education***, 100(3), 354-395.

Prevalent aspects of current thinking on teaching and learning get in the way of teachers adopting a constructivist approach. Central among these are (1) the dichotomous view of the learner and the curriculum; (2) the belief that student interest and involvement constitute a necessary and sufficient condition for worthwhile learning; (3) the distinction between comprehension and application; and (4) the view that the curriculum is a fixed agenda, consisting of well-ordered content mastered according to predetermined criteria. An appreciation of the highly contextualized nature of learning is necessary to alter prevailing beliefs about teaching. Because thinking is always about a specific thing and takes place in a specific setting, teachers must be attuned to varying norms of discourse in different disciplines and creating classrooms that allow students to advance their opinions freely. Subject-matter knowledge should be connected with children's experiences, and teachers should strive to provide authentic activities in the classroom. Transfer of knowledge must also be understood in terms of the contextual nature of knowledge. Rather than stressing the generalization of knowledge to other domains and thus its decontextualization, the constructivist perspective stresses knowledge connectedness. A "cognitive apprenticeship" approach, focusing on ideas rather than skills, and an "open-style" curriculum, which allows some of the important aspects of the curriculum to emerge through a process of negotiation with students would advance the adoption of a constructivist perspective.

Raizen, S. A. (1989). ***Reforming education for work: A cognitive science perspective.*** Berkeley: National Center for Research in Vocational Education, University of California. (ERIC Document Reproduction Service No. ED 314 642)

Recent cognitive research has raised doubts about the commonly accepted notion that learning to know and learning to do require the acquisition of a set of basic skills before further education can take place. Several studies of the ways people learn arithmetic, science, literacy, and other skills have documented cases of people who are able to learn to perform tasks in work and other nonschool settings that they cannot perform in formal schooling formats. Many individuals' situated problem-solving activities have proved to be far more complex than might be expected based on assessment of their textbook learning. Investigations of how individuals learn technical skills in military and civilian settings have suggested that effective instruction uses students' existing knowledge to build new knowledge; integrates instruction in domain-specific and basic skills; and simulate as closely as possible the context in which the new knowledge will eventually be applied. Evidence is accumulating that the separation between learning to know, learning to do, and doing serves to exacerbate rather than clarify learning impediments in school and on the job. Key research in cognitive science over the past 25 years has indicated physical and social contexts play a greater role in learning than previously thought. The consensus of the research is that all training programs—whether in or out of school—must focus on providing opportunities for learners to experience as closely as possible real-life working situations in which they can use both practical and theoretical knowledge in their chosen trade or profession.

Resnick, L. B. (1987, December). "The 1987 presidential address: Learning in and out of school." ***Educational Researcher***, 16 (9), 13-20.

Recent studies of cognitive performance in different practical settings have highlighted four broad discontinuities between learning in school and cognitive activity outside school: individual cognition in school versus shared cognition outside; pure mentation in school versus tool manipulation outside; symbol manipulation in school versus contextualized reasoning outside school; and generalized learning in school versus situation-specific competencies outside. If schooling is to play a broadly enabling role with respect to the economy—a role of preparing people to be adaptive to the various settings they may encounter over the course of their working lives—new forms of schooling will need to be developed. School-like forms of instruction now dominate even in many "on-the-job" training programs, including those in the military, community colleges, and proprietary training institutions. Technical, management, and professional education also suffer from too much adherence to instructional forms borrowed from traditional classrooms. Ways must be found to reintroduce key elements of traditional apprenticeship in forms appropriate to modern conditions of work. Education must also be aimed at helping people become adaptive learners who can respond flexibly to unexpected situations. Schooling must be modified in order to enable it to promote skills for learning outside school. The most effective programs teaching higher-order cognitive skills share three features. They have features characteristic of out-of-school cognitive performance and elements of apprenticeship, and they are organized around particular bodies of knowledge and interpretation rather than general abilities. The focus of schooling must be redirected to encompass more features of successful out-of-school functioning.

Resnick, L. B., and Klopfer, L. E. (1989). "Toward the thinking curriculum: An overview." In ***Toward the thinking curriculum: Current cognitive research*** (pp. 1-18). Alexandria, VA: Association for Supervision and Curriculum Development.

For many years, mainstream educational practice was informed by a psychology of learning that was derived from associationist and behaviorist principles and took learning to be an accumulation of pieces of knowledge and bits of skill. Thinking and reasoning became not the heart of education but hoped-for capstones that many students never reached. Recent cognitive research has demonstrated that the mental processes customarily associated with thinking are not restricted to some advanced or "higher-order" stage of mental development. Studies have also shown that experts on a topic reason more powerfully about that topic and learn new things related to it more easily than they do on other topics. Learning requires knowledge; however, knowledge cannot be given to students directly. Before knowledge becomes truly generative, students must learn to elaborate and question what they are told, examine new information in relation to other information, and build new knowledge structures. Cognitive apprenticeship, which lets students participate in disciplined and productive mental work just as traditional apprentices once participated in craft activities, is one way of helping students develop generative knowledge. Cognitive apprenticeship requires a real task, for example, an essay written for a real audience rather than solely for a grade. Second, cognitive apprenticeship involves contextualized practice of tasks rather than exercises on component skills that have been lifted out of the contexts in which they are to be used. Cognitive apprentices need plenty of opportunity to observe others doing the kind of work they are expected to learn to do.

Sargent, T., and Ettinger, J. (1998). "Educator internship programs: Providing a quality learning experience." In ***Teacher learning in workplaces and communities.*** Madison: Center on Education and Work, University of Wisconsin. <http://www.cew.wisc.edu/ncrve/briefs/CHANGE.PDF> (ERIC Document Reproduction Service No. ED 417 348)

When teachers participate in educator internship programs, they engage in contextualized learning that benefits many stakeholders besides themselves. Internships enable teachers to apply real-world experiences to classroom subject matter and validate and align curricular content, recognize that their expertise has value beyond the classroom, and link their experience to future student success. Student learning is enhanced when teachers can do the following: connect school-based learning with real-world problems and examples; provide the current information, skills, and knowledge needed to function in the workplace; provide accurate and timely information on careers; and create appropriate work-based learning experiences. Schools and colleges benefit the improved links to the community and increased access to technical workplace teaching technologies that from educator internship programs provide. Businesses and nonprofit organizations supporting internships benefit in many ways, including by having local schools and colleges focus directly on the skills and knowledge required by new employees. Research suggests that effective educator internship programs have four components: an action plan documenting how the educational experience will be translated into educational practice; a pre-internship orientation setting the stage for the employer's and intern's experience; an experiential component designed to provide in-depth understanding of a business or organization, a workplace technology application, the use of academic skills in emerging careers, or other insights important to the intern and sponsoring employee; and connecting activities, such as seminars/workshops, debriefing sessions, and reflective narratives that help educators bring their experiences back into the educational setting.

Scales, P. C., and Koppelman, D. J. (1997). "Service-learning in teacher preparation." In J. Schine (Ed.), ***Service learning. Ninety-sixth yearbook of the National Society for the Study of Education. Part I*** (pp. 118-135). Chicago: National Society for the Study of Education.

Few teachers are adequately prepared to participate in and lead service learning activities. A number of questions must be addressed in order to improve teacher preparation for service learning, which fall into the categories of (1) the goals of service learning; (2) the fit of service learning with a philosophy of youth development and education; (3) the operational needs and barriers to a service-learning program; and (4) realizing the potential of collaboration. Ideally, service learning is a marriage between meaningful learning experiences and the responses to community needs. Toward this purpose, both preservice and inservice professional development should heed a number of recommendations. Service learning should be integrated across the curriculum, rather than added on as a separate, required course. Programs also should ensure teachers' knowledge of the community and the social contexts of their students. Part of a teacher's task is to understand and respect the cultural climate of the community, including religious, racial, and other issues in order to know what kinds of services would be appropriate and welcome. Service learning should be linked to the educational philosophy of the participants through collaborative input and ownership of a common vision. Service learning programs should be implemented throughout a district to allow a progression of experiences. Teachers also need to identify the values and skills to be gained from service learning and ensure that they are connected to subject areas in the curriculum. Finally, educators need to be exposed to examples of successful service learning programs and teacher educators themselves must become involved.

Shulman, L. S. (1992). "Toward a pedagogy of cases." In J. H. Shulman (Ed.), ***Case method in teacher education*** (pp. 1-30). New York: Teachers College Press.

Proponents of case methods feel that they are an antidote to traditional methods, which have not inspired students, taught them to think critically and analytically, nor connect theory to action. A case is a "case-of-something" and therefore merits more serious consideration than a simple anecdote or vignette. It implies an underlying taxonomy or typology, however intuitive or informal, to which a given case belongs. Cases are rich in context and represent the narrative rather than the paradigmatic way of knowing. Narrative modes are specific, local, personal, and contextualized; paradigmatic modes are analytic, general, abstract, impersonal, and decontextualized. The contextualized detail and verisimilitude of a good case is a remedy for simplistic overgeneralizations of principles or maxims. Developments in cognitive psychology indicate why the case method may have strong instructional impact. There is growing evidence of the situated nature of cognition in which performance and development take place within specific social contexts, a fact that affects the transferability of learning. Learners may find it far easier to remember and use ideas that are located in the narrative form of cases. The case method may also be particularly useful to teaching because, like medicine and law, it is an ill-structured domain (as opposed to fields such as mathematics or physics) requiring a high degree of cognitive flexibility. In teaching, knowledge needs to be organized flexibly into networks of concepts and cases rather than more rigidly into schemata and hierarchies.

Stasz, C. (1997). ***Designing classrooms that work: Conception and pilot study***. Berkeley: National Center for Research in Vocational Education, University of California. (ERIC Document Reproduction Service No. ED 410 695)

In 1996, a 6-week "mini-sabbatical" for high school teachers and teacher trainers, Designing Classrooms that Work, was developed and pilot tested. The mini-sabbatical's four explicit goals were as follows: increase teacher knowledge of work practice and the authentic applications of domain knowledge (for example, math, science, and English) in work; create high-quality, integrated curricula incorporating domain-specific and generic skills; adopt teaching roles to support authentic learning; and develop alternative assessments that provide meaningful feedback to students and teachers. The mini-sabbatical was structured to reflect conceptions of adult learning and learning to teach, and its design incorporated multiple assessment instruments and other data sources (student and teacher journals, written evaluations, teacher survey, curriculum design activities, and focus group). Most teacher participants were highly enthusiastic about the mini-sabbatical's value with respect to the knowledge they gained and the opportunity it provided for changing teaching practice. Most participating teachers showed and expressed fairly substantial changes over the course of the mini-sabbatical that appeared to continue when they returned to their home schools. The primary lessons learned from the pilot test were as follows: teachers need more assistance in developing assessments; teachers have difficulty relinquishing control over learning; teacher collaboration is an important catalyst for learning; staff development should support the reflective practice; industry experience is insufficient for developing work-related curricula; and work-based learning requires different teacher planning. The mini-sabbatical was deemed a useful starting point for developing inservice and preservice programs for teachers, particularly those involved in school-to-career programs.

Wang, M. C., and Palinscar, A. S. (1989). "Teaching students to assume an active role in their learning." In M. C. Reynolds (Ed.), ***Knowledge base for the beginning teacher*** (pp. 71-84). New York: Pergamon.

Effective schooling enables every student to become an active learner: one who assumes responsibility for acquiring knowledge and skills and sustaining a pattern of self-directed, lifelong learning. Effective learners are distinguished from less-effective learners by their ability to take responsibility for managing, monitoring, and evaluating their learning; by their adaptation and use of what they know in the acquisition of new knowledge and skills; and by their flexibility and skill in making adaptations in their learning environment. Although many students naturally display these competencies and attitudes, many others require explicit instruction in the active learning role. This instruction can be provided in the form of cognitive-strategy instruction, which essentially teaches students self-instructive processes. When these processes are matched to features of the criterial task and the learning environment, they facilitate knowledge acquisition in specific subject-matter areas and sustain motivation for improved performance. Findings from research suggest that cognitive-strategy instruction is feasible and can be implemented effectively across subject-matter areas to improve students' ability to plan, coordinate, monitor, and revise their own learning activity. The dual focus of cognitive-strategy and subject-matter instruction can increase students' ability to become self-instructive, to achieve schooling success, and to develop perceptions of self-competence in sustaining an active role in their own learning.

Webb, N. M., and Palincsar, A. S. (1996). Group processes in the classroom. In D. C. Berliner and R. C. Calfee (Eds.), ***Handbook of educational psychology*** (pp. 841-873). New York: Macmillan.

Constructivism posits that knowledge or meaning results from individuals' interpretations of their experiences in particular contexts. Evolving constructivist views of the learner are resulting in increased interest in group processes is increasing among educational and cognitive psychologists. The following processes have been shown to promote learning and cognitive development in group settings: conflict and controversy (conflict encourages individuals to explain and justify their own positions, raises uncertainties about their beliefs, encourages them to seek to information to resolve their disagreements, and helps them understand alternative viewpoints); co-construction of ideas (learners can co-construct knowledge that they did not have before collaboration); giving and receiving help (those receiving the help gain new knowledge, and those providing the help are encouraged to clarify and reorganize their knowledge in new ways); and social-emotional processes (group members working toward common goals will praise, encourage, and support each other's efforts, resulting in greater effort and greater liking of the task and other learners). The following features of group work have been demonstrated to influence group processes: reward or incentive structures; composition of small groups; group size; training in communication skills; tasks structured to require certain kinds of interaction (role specialization, reciprocal questioning, controversy versus concurrence seeking); required discussion of group functioning; and a structured role for the teacher. These features provide a menu of possible ways to enhance the quality of collaboration in classrooms.

Wiggins, G. (1993, November). "Assessment: Authenticity, context, and validity." ***Phi Delta Kappan***, 74, 200-214.

There is an inescapable tension between the challenges presented by contextualized performance and conventional, large-scale, generic testing. Tests that decontextualize knowledge fail to prepare students for real, "messy" uses of knowledge in context. Because competent performance requires context and judgment, it makes no intellectual sense to test for "knowledge" as if mastery were an unvarying response to unambiguous stimuli. One drawback of performance (authentic) assessment is that it works against standardization and reliability. Modern, professionally designed tests intended for national and state use tend to sacrifice validity for reliability, which is to say that they are more concerned with the precision of scores than with the intellectual value of the challenge. It is one thing to learn to respond to an unambiguous stimulus; it is another to become disposed to invoke the right habits of mind in a fluid performance context. Good teachers/coaches have students constantly moving back and forth between drill and "whole" performance. The following are among the issues that must be considered

in the debate over authenticity versus reliability: the relationship between context, constraints, and authenticity; the authenticity of contextual constraints; the relationship between authenticity and validity; the context of testing and its effect on students' performance on tests; face validity and the notions of task worthiness and incentives to perform well. As the debate over these issues continues, educators should at least demand that test designers recognize their obligation to link their tests to the tasks, contexts, and "feel" of real-world challenges.

Winne, Philip H. (1995). "Inherent details in self-regulated learning." ***Educational Psychologist***, 30(4), 173-187.

Self-regulated learning (SRL) has become a pivotal construct in contemporary accounts of effective academic learning. Several areas of theory and empirical research that are not prominently cited in educational psychology research into SRL suggest that nondeliberative, knowledge-based elements are inherent in the processes of SRL and in learning more generally. Because SRL comprises knowledge, beliefs, and learned skills, it is malleable in response to environmental influences. SRL forms incrementally as a learner engages with instructional experiences––even those occupying only a single study session or a few adjacent sessions. The information available in those experiences and its forms of representation (that is, the instructional design realized in study sessions) provide informational resources from which learners construct knowledge about what productive self-regulation is and how and when it can be used. Although all learners inherently self-regulate, not all SRL is productive. When inherently self-regulating learners engage in solitary study, the inherent qualities of cognition become important. Solitary study lacks the dynamically responsive scaffolding and guidance that can be made available when learning proceeds in the context of social interaction or intelligently active media. If solitary study continues to be prominent, grappling with the full nature and varied roles of SRL in academic learning will require more basic research on the information and information processing that jointly constitute SRL. Issues of importance for instructional design include issues of individual differences regarding a learners knowledge base about SRL and knowledge about when and under what conditions that knowledge is engaged.

Woods, D. R. (1994). ***Problem-based learning: How to gain the most from PBL.*** Waterdown, Ontario: Donald R. Woods.

Unlike the subject-based learning (SBL) format, in which teachers determine what learners need to know, the problem-based learning

(PBL) format presents students with a problem and requires them to discover for themselves what they need to know to solve it. Having a problem at the beginning of the learning process provides a concrete application, motivates learners, and gives them a context into which knowledge can be embedded, integrated, and comprehended far better than is possible by SBL. To make the most of PBL learning, learners must become confident in and skilled at problem solving. Research has shown that confidence and skill are developed if learners become aware of their problem-solving process, systematically reflect on and monitor their problem-solving process, examine things from different perspectives, and use measurable criteria to make their decisions. Self-directed, interdependent, small group PBL helps learners acquire lifetime learning skills in the context that people are the greatest resource of information. The tasks of self-directed, interdependent, small group PBL are as follows: the group explores the problem, creates hypotheses, identifies issues, identifies what is already known and pertinent, identifies what is not known, prioritizes the learning needs, sets learning goals and objectives, and allocates resources; members identify which tasks each will perform; individuals engage in self-study and preparation; individuals return to the group and share their new knowledge; the group applies the knowledge to solve the problem; and the group assesses the new knowledge, the problem solution, and the effectiveness of the process used.

Zeichner, K. (1996). "Educating teachers for cultural diversity." In K. Zeichner, S. Melnick, and M. L. Gomez (Eds.), ***Currents of reform in preservice teacher education*** (pp. 113-175). New York: Teachers College Press.

To teach poor, ethnic, and language-minority students successfully, a teacher needs to learn about his or her students and their families, and build bridges between the cultural resources that students bring to school and classroom cultures. Field experiences in culturally diverse settings have been used in preservice teacher education to develop greater cultural sensitivity and intercultural teaching competence. One example of a community field experience is the human service project at Knox College (Illinois), which enables prospective teachers, many of whom have led lives distant from poverty, to come to grips with social inequality in a direct way. In addition to reading about poverty, students work in various social service agencies or in a more informal setting, such as a home. Other direct experiences include the required completion of a minimum number of practicum and student teaching experiences in schools serving minority students, and intensive cultural immersion experiences in which students live and teach in a minority community. The literature provides clues about how to conduct teacher education that prepares teachers to teach all students successfully; however, little is known about the impact of these strategies on the teaching of prospective teachers. More must be learned about the particular kinds of field experiences and courses that facilitate the personal and professional transformations that student teachers must undergo to become successful teachers in cross-cultural situations.

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